Series 1960, No. 10

Issued December 1963

SOIL SURVEY
Panola County, Mississippi

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
in cooperation with
MISSISSIPPI AGRICULTURAL EXPERIMENT STATION

HOW TO USE THE SOIL SURVEY REPORT

THIS SOIL SURVEY of Panola County, Miss., will serve several groups of readers. It will help farmers in planning the kind of management that will protect their soils and provide good yields; assist engineers in selecting sites for roads, buildings, ponds, and other structures; aid foresters in managing woodlands; and add to our knowledge of soil science.

Locating Soils

Use the index to map sheets at the back of this report to locate areas on the large map. The index is a small map of the county on which numbered rectangles have been drawn to show where each sheet of the large map is located. When the correct sheet of the large map has been found, it will be seen that boundaries of the soils are outlined, and that there is a symbol for each kind of soil. All areas marked with the same symbol are the same kind of soil, wherever they occur on the map. The symbol is inside the area if there is enough room; otherwise, it is outside the area and a pointer shows where the symbol belongs.

Finding Information

This report contains sections that will interest different groups of readers, as well as some sections that may be of interest to all.

Farmers and those who work with farmers can learn about the soils in the section "Descriptions of Soils" and then turn to the section "Use and Management of Soils." In this way, they first identify the soils on their farm and then learn how these soils can be managed and what yields can be expected. The "Guide to Mapping Units" at the back of the report will simplify use of the map and report. This guide lists each soil and land type mapped in the county, and the page where each is described. It also lists, for each soil and land type, the capability unit and woodland suitability group, and the pages where each of these is described.

Foresters and others interested in woodlands can refer to the section "Woodland." In that section the soils in the county are grouped according to their suitability for trees, and factors affecting the management of woodland are explained.

Engineers will want to refer to the section "Engineering Applications." Tables in that section show characteristics of the soils that affect engineering.

Scientists and others who are interested will find information about how the soils were formed and how they were classified in the section "Formation and Classification of Soils."

Students, teachers, and other users will find information about soils and their management in various parts of the report, depending on their particular interest.

Newcomers in Panola County will be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "Additional Facts About the County."

* * * * *

Fieldwork for this survey was completed in 1960. Unless otherwise indicated, all statements in the report refer to conditions in the county at that time. The soil survey of Panola County was made as part of the technical assistance furnished by the Soil Conservation Service to the Panola County Soil and Water Conservation District

Cover picture: Polled Herefords grazing bermudagrass.

U.S GOVERNMENT PRINTING OFFICE:1963

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C., 20402

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SOIL SURVEY OF PANOLA COUNTY, MISSISSIPPI

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UNITED STATES DEPARTMENT OF AGRICULTURE IN COOPERATION WITH THE MISSISSIPPI AGRICULTURAL EXPERIMENT STATION

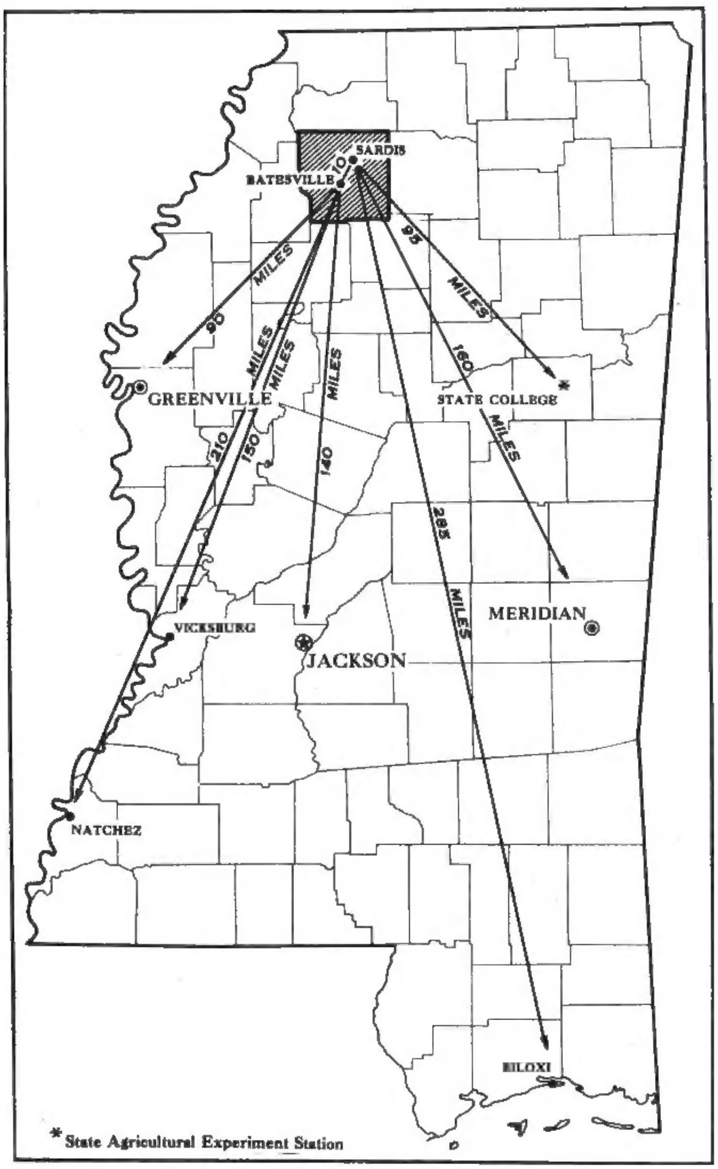

Figure 1.—**Location of Panola County in Mississippi.**

PANOLA COUNTY is in the northwestern part of Mississippi and occupies a total land area of 685 square miles (fig. 1). It has two county seats, Batesville and Sardis. Batesville is about 60 miles south of Memphis, Tenn., and about 140 miles north of Jackson, Miss., the State capital. Sardis is about 10 miles northeast of Batesville.

The county is mostly agricultural, although cotton and other crops are processed and some articles are manufactured. Soybeans, cotton, corn, and oats are the main crops. Dairying and raising of beef cattle are also important.

How Soils are Named, Mapped, and Classified

Soil scientists made this survey to learn what kinds of soils are in Panola County, where they are located, and how they can be used. They went into the county knowing they likely would find many soils they had already seen, and perhaps some they had not. As they traveled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug or bored many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down to the rock material that has not been changed much by leaching or by roots of plants.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to uniform procedures. To use this report efficiently, it is necessary to know the kinds of groupings most used in a local soil classification.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Alligator and Memphis, for example, are the names of two soil series.

All the soils in the United States having the same series name are essentially alike in natural characteristics.

Many soil series contain soils that are alike except for texture of their surface layer. According to this difference in texture, separations called soil types are made. Within a series, all the soils having a surface layer of the same texture belong to one soil type. Alligator clay and Alligator silty clay loam are two soil types in the Alligator series. The difference in texture of their surface layers is apparent from their names.

Some soil types vary so much in slope, degree of erosion, number and size of stones, or some other feature affecting their use, that practical suggestions about their management could not be made if they were shown on the soil map as one unit. Such soil types are divided into soil phases. The name of a soil phase indicates a feature that affects management. For example, Alligator clay, 0 to ½ percent slopes, is one phase of Alligator clay, a soil type that in this county ranges from level to nearly level.

After a fairly detailed guide for classifying and naming the soils had been worked out, the soil scientists drew soil boundaries on aerial photographs. They used these photos for their base map because they show woodlands, buildings, field borders, trees, and other detail that greatly help in drawing boundaries accurately. The soil map in the back of this report was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning management of farms and fields, a mapping unit is nearly equivalent to a soil type or a phase of a soil type. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil type or soil phase. Two or more kinds of soils are sometimes mapped together in one mapping unit because their differences do not affect management enough for the soils to be mapped separately; for example, Memphis, Natchez, and Guin soils, 17 to 40 percent slopes, eroded.

In most mapping, there are areas to be shown that are so gullied, so shallow, or so frequently worked by wind and water that they cannot be called soils. These areas are shown on a soil map like other mapping units, but they are given descriptive names, such as Gullied land or Mixed alluvial land, and are called land types rather than soils.

Only part of the soil survey was done when the soil scientist had named and described the soil series and mapping units, and had shown the location of the mapping units on the soil map. The mass of detailed information he had recorded then needed to be presented in different ways for different groups of users, among them farmers, managers of woodlands, and engineers.

To do this efficiently, he had to consult with persons in other fields of work and jointly prepare with them groupings of soils that would be of practical value to different users. Such groupings are the capability classes, subclasses, and units, designed primarily for those interested in producing the short-lived crops and tame pasture; woodland suitability groups, for those who need to manage wooded tracts; and the classifications used by engineers who build highways or structures to conserve soil and water.

General Soil Map

After a soil scientist studies the soils in a locality and the way they are arranged, he can make a general map that shows several main patterns of soils, called soil associations. Such a map is the colored general soil map in the back of this report. Each association, as a rule, contains a few major soils and several minor soils, in a pattern that is characteristic although not strictly uniform.

The soils within any one association are likely to differ from each other in some or in many properties; for example, slope, depth, stoniness, or natural drainage. Thus, the general soil map shows, not the kind of soil at any particular place, but patterns of soils, in each of which there are several different kinds of soils.

Each soil association is named for the major soil series in it, but, as already noted, soils of other series may also be present. The major soil of one soil association may also be present in another association, but in a different pattern.

The general map showing patterns of soils is useful to people who want a general idea of the soils, who want to compare different parts of a county, or who want to know the possible location of good-sized areas suitable for a certain kind of farming or other land use.

The Sardis Reservoir, in the northeastern part of Panola County, occupies about 1 percent of the county and is not included in any of the soil associations adjacent to it.

1. Alligator-Dowling association: Poorly drained soils of broad flats and narrow depressions on flood plains

This soil association is in two slack-water areas. The larger area extends along most of the western boundary of the county and ranges from ½ mile to 5 miles in width. The smaller area is in the northwestern corner of the county.

The Alligator soils are dominant in this soil association and are on broad flats. Their surface soil is dark-gray silty clay loam to plastic clay, and their subsoil is gray or light-gray, plastic clay. The Dowling soils are somewhat similar to the Alligator soils in color and texture, but they are in long, narrow depressions instead of on the flats. The Alligator and Dowling soils are so wet in rainy periods that drainage is difficult. They crack severely in dry periods.

This soil association occupies about 5 percent of the land in the county. The Alligator soils make up about 85 percent of the association, and the Dowling soils make up most of the rest.

Most of this soil association has been cleared and is planted to soybeans. A small acreage is in cotton. Areas not in crops are in pasture or trees.

2. Falaya-Waverly-Collins association: Moderately well drained to poorly drained, silty soils of flats and depressions on flood plains

This soil association is in the western part of the county in a belt that varies between ¼ mile and 7 miles in width. It extends from the northern boundary of the county to the southern boundary and is east of the Alligator-Dowling association and west of the bluffs at the foot of upland hills.

The Falaya soils are dominant in this association. They are somewhat poorly drained. Their surface layer is

brown silt loam to silty clay loam, and their subsoil is mottled, gray and brown silt loam to silty clay loam. The Waverly soils are poorly drained. They have a gray silt loam surface layer that is underlain by mottled, gray and brown silt loam to silty clay loam. The Collins soils are moderately well drained and have a brown silt loam surface layer and upper subsoil. The lower subsoil is mottled, brown and gray silt loam.

This soil association occupies about 15 percent of the land in the county. About 65 percent of the association is Falaya soils, about 15 percent is Waverly soils, about 19 percent is Collins soils, and about 1 percent is Mixed alluvial land.

The Falaya and Waverly soils in this association have been cleared, but most of the acreage in Collins soils has not. Most of the cotton in the county is planted on the soils of this association, which are among the best on the delta.

3. Loring-Grenada-Memphis association: Well drained and moderately well drained, gently sloping to very steep soils in thick loess

This is the most extensive soil association in the county. It is on loessal uplands and occupies most of the northern part of the county, as well as large areas in the central and southern parts. In the central and southern parts, its wide extent is broken in many places by areas of the Collins-Falaya-Grenada-Calloway association.

The Loring soils are dominant in this association. These well drained and moderately well drained soils have a brown surface layer of silt loam and a brown or dark-brown subsoil of heavy silt loam or light silty clay loam. A fragipan has formed at a depth of about 30 inches. The Grenada soils are moderately well drained. Their surface layer is brown or dark-brown silt loam, and their subsoil is brown or dark-brown, heavy silt loam. At a depth of about 24 inches is a fragipan. The well-drained Memphis soils have a brown silt loam surface layer. Their subsoil is brown or dark-brown heavy silt loam or light silty clay loam. Memphis soils do not have a fragipan.

This soil association makes up about 37 percent of the land in the county. About 50 percent of the association is Loring soils, about 22 percent is Grenada soils, and about 6 percent is Memphis soils. About 10 percent is Collins soils, 10 percent is Falaya soils, 1 percent is Natchez soils, and 1 percent is Guin soils.

Most of this soil association has been cleared, and some of it is cultivated. The ridges of the association are in cotton, corn, or pasture. Generally, the gentle slopes are pastured and the steep slopes are wooded.

4. Collins-Falaya-Grenada-Calloway association: Somewhat poorly drained and moderately well drained, silty soils in alluvium on nearly level flood plains and benches, or in thick loess on nearly level to moderately sloping uplands

This soil association is in large areas along the Little Tallahatchie and Yocona Rivers and is in small areas along small streams in the northern part of the county. In most places the association is surrounded by the Loring-Grenada-Memphis association. The Collins and Falaya soils are on flood plains and benches in alluvium from soils formed in loess. The Grenada and Calloway soils are in thick, loessal deposits on uplands.

The Collins soils make up more than half of this soil association. These nearly level, moderately well drained soils have a dark-brown silt loam surface layer and upper subsoil. Their lower subsoil is mottled, brown and gray silt loam. The Falaya soils are nearly level and somewhat poorly drained. Their surface layer is dark-brown silt loam or silty clay loam, and their subsoil is mottled, gray and brown silt loam to silty clay loam. The Grenada soils are nearly level to moderately sloping and moderately well drained. The surface layer of Grenada soils is brown or dark-brown silt loam, and the subsoil is brown or dark-brown heavy silt loam. A fragipan occurs at a depth of about 24 inches. The Calloway soils are nearly level to gently sloping and somewhat poorly drained. They have a dark grayish-brown silt loam surface layer, a yellowish-brown heavy silt loam subsoil, and a fragipan at a depth of about 16 inches.

This soil association covers about 23 percent of the land in the county. The Collins soils occupy about 54 percent of the association, the Falaya about 35 percent, the Grenada about 3 percent, and the Calloway about 5 percent. Henry soils, Waverly soils, and Mixed alluvial land occupy the remaining 3 percent.

Most of this soil association has been cleared and is in cotton, corn, or pasture. The association includes some of the best agricultural land in the county. Because of the Sardis Dam, there is little flooding.

5. Ruston-Providence-Eustis association: Excessively drained, steep or very steep soils in sandy, Coastal Plain sediments on side slopes, and moderately well drained soils in thin loess on ridges

This soil association makes up most of the eastern part of the county. It extends from the northern to the southern boundary and is ½ mile to 6 miles wide. It surrounds the Mixed alluvial land-Falaya-Waverly association and is east of the Loring-Grenada-Memphis association.

The Ruston soils occupy most of this association. They are well drained with a surface layer of very dark grayish-brown fine sandy loam and a subsoil of yellowish-red to red sandy clay loam. The Providence soils are moderately well drained. Their surface layer is brown or dark-brown silt loam, and their subsoil is strong-brown light silty clay loam. The Providence soils formed in a thin mantle of loess over material of the Coastal Plain. They have a fragipan at a depth of about 24 inches. The Eustis soils are excessively drained. They have a surface layer of brown sandy loam and a subsoil of strong-brown to yellowish-red loamy sand.

This soil association occupies about 18 percent of the land in the county. About 60 percent of the association consists of Ruston soils, about 15 percent of Providence soils, and about 15 percent of Eustis soils. Collins soils occupy 2 percent of the association, Falaya soils 2 percent, Cuthbert soils 1 percent, and Mixed alluvial land 5 percent.

Because it is steep or very steep, most of this association is wooded. Small parts are in pasture, and the narrow bottoms and ridges are in row crops.

6. Mixed alluvial land-Falaya-Waverly association: Somewhat poorly drained or poorly drained, stratified, silty and sandy soils, or silty soils, on flood plains

This soil association is in the eastern part of the county. It is on flood plains between the northern side of the Sar-

dis Reservoir and the southeastern edge of the Ruston-Providence-Eustis soil association.

Mixed alluvial land covers most of this association. It is acid, excessively drained to somewhat poorly drained, and stratified. The strata vary in thickness and color. The Falaya soils are somewhat poorly drained. Their surface layer of dark-brown silt loam is underlain by mottled, gray and brown silt loam to silty clay loam. The Waverly soils are poorly drained. They have a gray silt loam surface layer and a mottled, gray and brown silt loam subsoil.

This soil association occupies about 1 percent of the land in the county. About 75 percent of the acreage is Mixed alluvial land, 18 percent is Falaya soils, 5 percent is Waverly soils, and about 2 percent is Collins and other soils.

Most of this association has been cleared and is in row crops or pasture. Part of the acreage is idle land that is reverting to trees.

Descriptions of Soils

This section describes the soil series of Panola County and their mapping units. Included for each series is a description of the surface soil and subsoil of a soil representative of the series. Unless indicated otherwise in the name of the soils or in their descriptions, the soils in the series have a surface soil and subsoil like those of the representative soil. In the section "Formation and Classification of Soils," at least one profile of each series in the county is described in detail.

The approximate acreage and proportionate extent of the soils are given in table 1, and their location can be seen on the detailed map at the back of the report.

Many soil terms are defined in the Glossary. Some terms are explained here so that the soil descriptions can be understood more readily.

In this section only words are used to describe color, but both words and Munsell notations are used in the section "Formation and Classification of Soils." Soil scientists use Munsell notations to indicate the precise color of a soil, and they provide the equivalent in words for readers not familiar with the system. They compare the color of a soil sample with that on a standard color chart. If the Munsell notation is 10YR 5/3, for example, the color is called brown.

The textural name of a soil refers to the content of sand, silt, and clay. Texture is determined by the way the soil feels when rubbed between the fingers and is checked further by laboratory analyses.

Friable, firm, plastic, and other terms are used to describe consistence. Soil scientists estimate consistence by the way a soil feels when it is squeezed or molded with the fingers.

A fragipan is a dense, brittle, subsurface layer that is very low in organic matter and clay but rich in silt or very fine sand. The layer is slowly or very slowly permeable to water and is generally mottled.

Alligator Series

The Alligator series consists of poorly drained, strongly acid soils that formed in fine-textured alluvium on the low, level or nearly level delta of the Mississippi River.

The surface layer of these soils is dark gray and ranges from silty clay loam to clay. The subsoil is gray or light-gray clay mottled with brown.

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Area	Extent
	Acres	*Percent*
Alligator clay, 0 to ½ percent slopes	7, 470	1. 7
Alligator clay, ½ to 2 percent slopes	1, 145	. 3
Alligator silt loam, overwash, ½ to 2 percent slopes	530	. 1
Alligator silty clay loam, 0 to ½ percent slopes	7, 935	1. 8
Alligator silty clay loam, ½ to 2 percent slopes	2, 365	. 5
Calloway silt loam, 0 to 2 percent slopes	1, 375	. 3
Calloway silt loam, 2 to 5 percent slopes	4, 002	. 9
Collins silt loam	61, 457	14. 0
Collins silt loam, local alluvium	11, 625	2. 6
Cuthbert and Providence soils, 12 to 35 percent slopes, eroded	900	. 2
Dowling silty clay and clay	2, 020	. 5
Falaya silt loam	56, 198	12. 8
Falaya silt loam, local alluvium	2, 438	. 6
Falaya silty clay loam	4, 319	1. 0
Falaya and Waverly silt loams	4, 670	1. 1
Grenada silt loam, 0 to 2 percent slopes	254	. 1
Grenda silt loam, 2 to 5 percent slopes	486	. 1
Grenada silt loam, 2 to 5 percent slopes, eroded	8, 291	1. 9
Grenada silt loam, 2 to 5 percent slopes, severely eroded	1, 817	. 4
Grenada silt loam, 5 to 8 percent slopes, eroded	881	. 2
Grenada silt loam, 5 to 8 percent slopes, severely eroded	11, 496	2. 6
Grenada silt loam, 8 to 12 percent slopes, eroded	523	. 1
Grenada silt loam, 8 to 12 percent slopes, severely eroded	1, 475	. 3
Gullied land, sandy	43, 048	9. 8
Gullied land, silty	67, 889	15. 5
Henry silt loam	1, 722	. 4
Loring silt loam, 2 to 5 percent slopes, eroded	10, 070	2. 3
Loring silt loam, 2 to 5 percent slopes, severely eroded	10, 217	2. 3
Loring silt loam, 5 to 8 percent slopes	315	. 1
Loring silt loam, 5 to 8 percent slopes, eroded	2, 611	. 6
Loring silt loam, 5 to 8 percent slopes, severely eroded	24, 563	5. 6
Loring silt loam, 8 to 12 percent slopes	886	. 2
Loring silt loam, 8 to 12 percent slopes, eroded	721	. 2
Loring silt loam, 8 to 12 percent slopes, severely eroded	5, 575	1. 3
Loring silt loam, 12 to 17 percent slopes, eroded	6, 957	1. 6
Loring silt loam, 12 to 17 percent slopes, severely eroded	5, 746	1. 3
Memphis silt loam, 2 to 5 percent slopes, eroded	868	. 2
Memphis silt loam, 2 to 5 percent slopes, severely eroded	1, 251	. 3
Memphis silt loam, 5 to 8 percent slopes, severely eroded	2, 178	. 5
Memphis and Loring silt loams, 17 to 35 percent slopes, eroded	9, 554	2. 2
Memphis and Loring silt loams, 17 to 35 percent slopes, severely eroded	1, 068	. 2
Memphis, Natchez, and Guin soils, 17 to 40 percent slopes, eroded	8, 514	1. 9
Mixed alluvial land	11, 567	2. 6
Ruston, Providence, and Eustis soils, 12 to 17 percent slopes, eroded	5, 563	1. 3
Ruston, Providence, and Eustis soils, 17 to 35 percent slopes, eroded	18, 692	4. 3
Waverly silt loam	5, 153	1. 2
Total	438, 400	100. 0

These soils occur with the Dowling soils and are similar to them in color and texture, but not in position. The Alligator soils are on broad flats and are slightly above the Dowling soils, which are in depressions.

The Alligator soils are high in natural fertility, but unless adequately drained, they produce low yields. Yields are best in moderately dry years.

In Panola County these soils are in the northern half along the Quitman County line. About 90 percent of the acreage is in row crops, 5 percent is in pasture, and 5 percent is in trees. Soybeans and cotton are the main row crops.

Alligator clay, 0 to ½ percent slopes (Aa).—This is a poorly drained, level soil on low bottoms of the delta. The major layers of a typical profile are:

0 to 5 inches, dark-gray, firm, plastic clay with dark yellowish-brown mottles.
5 to 30 inches, gray, firm, plastic clay with strong-brown mottles.
30 to 54 inches, gray, firm, very plastic clay with many strong-brown mottles.

When this soil is wet, it is sealed over, puddled, and poorly aerated. When it dries, it cracks so severely that the roots of some plants may be injured. Surface runoff and internal drainage are very slow, and the available moisture-holding capacity is moderate. Fields can be cultivated within only a narrow range of moisture content. The organic-matter content is low.

About 88 percent of this soil is in row crops, 7 percent is in pasture, and 5 percent is in trees. The soil is well suited to hay and pasture and to sweetgum, water oak, elm, and other trees. Soybeans and a few other row crops can be grown in some fields, but the planting of row crops is risky. A good stand of cotton is sometimes hard to obtain. Capability unit 14 (A8–IIIw–11); woodland suitability group 1.

Alligator clay, ½ to 2 percent slopes (Ab).—Surface drainage is better on this soil than it is on Alligator clay, 0 to ½ percent slopes, and a good stand of crops can be obtained with less risk.

About 90 percent of this soil is in row crops, 5 percent is in pasture, and 5 percent is in trees. The soil is well suited to hay and pasture and to sweetgum, willow, cypress, and other water-tolerant trees. Soybeans also grow well. Capability unit 14 (A8–IIIw–11); woodland suitability group 1.

Alligator silty clay loam, 0 to ½ percent slopes (Ad).—Because this soil has a coarser textured surface layer than Alligator clay, 0 to ½ percent slopes, it is easier to work than the clay and can be cultivated within a wider range of moisture content. Consequently, a good stand of crops is easier to obtain, although the soil is almost flat and runoff is very slow.

About 90 percent of this soil is in row crops, 5 percent is in pasture, and 5 percent is in trees. The soil is well suited to hay or pasture and to sweetgum, cypress, water oak, and other water-tolerant trees. Soybeans are suitable row crops. Capability unit 12 (A8–IIIw–5); woodland suitability group 1.

Alligator silty clay loam, ½ to 2 percent slopes (Ae).—This soil is more sloping and coarser textured than Alligator clay, 0 to ½ percent slopes, and it, therefore, has better surface drainage and is easier to work. In dry weather it does not crack so badly as the clay. Included with this soil are a few areas of silt loam. A few spots near bluffs are alkaline in the subsoil instead of acid.

About 92 percent of this soil is used for row crops, 5 percent for pasture, and 3 percent for trees. The soil is well suited to hay or pasture and to trees such as sweetgum, cypress, and water oak. Capability unit 12 (A8–IIIw–5); woodland suitability group 1.

Alligator silt loam, overwash, ½ to 2 percent slopes (Ac).—Because this soil is coarser textured in the surface layer than Alligator clay, 0 to ½ percent slopes, it is easier to cultivate than the clay and can be cultivated within a wider range of moisture content. Surface runoff is more rapid than that on the level clay soil, and a good stand of crops is easier to obtain. The surface layer does not crack so badly in dry weather.

About 95 percent of this soil is in row crops. The rest is in pasture. The soil is well suited to hay or pasture and to sweetgum, water oak, and other water-tolerant trees. Soybeans are well-suited row crops. Capability unit 13 (A8–IIIw–7); woodland suitability group 1.

Calloway Series

In the Calloway series are somewhat poorly drained, strongly acid or medium acid soils that formed in thick deposits of loess on uplands. The slope ranges from 0 to 5 percent.

The surface layer of these soils is silt loam that ranges from mottled, gray and very dark grayish brown to brown. The subsoil commonly is yellowish-brown heavy silt loam. A fragipan is present, and it is generally at a depth of about 16 inches.

Occurring with the Calloway soils are the Memphis, Loring, Grenada, and Henry soils. The drainage of the Calloway soils is not so good as that of the Memphis, Loring, and Grenada soils, which have a darker brown, thicker subsoil than have the Calloway. The depth to the fragipan in the Calloway soils is not so great as that in the Loring and Grenada soils.

The Calloway soils in this county are scattered throughout the hilly parts. About 53 percent of their acreage is in row crops, 46 percent is in pasture, and 1 percent is in trees. Cotton and corn are the main row crops.

Calloway silt loam, 0 to 2 percent slopes (CaA).—This soil occurs on uplands. It is somewhat poorly drained and has a fragipan at a depth of about 16 inches. The major layers of a typical profile are:

0 to 6 inches, mottled, gray and very dark grayish-brown, friable silt loam.
6 to 16 inches, yellowish-brown, friable, slightly sticky silt loam with dark-brown mottles.
16 to 39 inches, gray, mottled silt loam; compact and brittle.
39 to 50 inches, mottled, strong-brown, yellowish-brown, and light olive-gray silt loam.

Internal drainage is moderate above the fragipan and is very slow within it. The fragipan limits the thickness of the friable soil and, consequently, the capacity for holding available water. This soil is low in organic-matter content and in natural fertility. A plowpan forms readily. An occasional rill indicates that the soil is susceptible to only slight erosion.

About 49 percent of this soil is in row crops, 50 percent is in pasture, and 1 percent is in trees. Pasture and trees

***Figure 2.*—Soil profile of Calloway silt loam, 2 to 5 percent slopes. A fragipan has formed at a depth of about 14 inches.**

are best suited, but row crops produce fairly good yields. Capability unit 11 (A7-IIIw-4); woodland suitability group 7.

Calloway silt loam, 2 to 5 percent slopes (CaB).—This gently sloping soil has more rapid runoff than Calloway silt loam, 0 to 2 percent slopes, and, therefore, better surface drainage. It resembles the more nearly level soil in that it has a fragipan (fig. 2). Included with this gently sloping soil are large eroded areas.

About 55 percent of this soil is in row crops, 44 percent is in pasture, and 1 percent is in trees. Pasture and trees are better suited than row crops, which produce only fair yields. Capability unit 11 (A7-IIIw-4); woodland suitability group 7.

Collins Series

This series consists of moderately well drained, strongly acid to medium acid soils that formed in silty alluvium on nearly level bottom lands. The dominant slope range is 0 to 3 percent.

In most places the surface layer and upper part of the subsoil are dark-brown silt loam. The lower subsoil is dark-brown silt loam with many gray and yellowish-brown mottles.

The Collins soils occur with the Falaya and the Waverly soils. They are better drained than the Falaya and Waverly soils and are free of mottles to a greater depth.

In this county the Collins soils are mainly on bottom lands in the hilly parts. Small areas are on the delta adjacent to the bluffs. About 65 percent of the acreage is in row crops, 34 percent is in pasture, and 1 percent is in trees. The principal row crops are cotton and corn.

Collins silt loam (0 to 2 percent slopes) (Cm).—This is a moderately well drained, friable soil on nearly level bottom lands. The major layers are as follows:

0 to 6 inches, dark-brown, friable silt loam.
6 to 24 inches, brown, friable silt loam with light yellowish-brown mottles.
24 to 48 inches, yellowish-brown, friable silt loam with dark yellowish-brown, light-gray, and very pale brown mottles.

Included with this soil are small areas of Vicksburg silt loam and a few small, sandy areas. The Vicksburg soils were not mapped separately in Panola County.

Collins silt loam is well suited to row crops, trees, hay, and pasture. It has a high available moisture-holding capacity. The organic-matter content is low, however, and a plowpan forms readily. Practically all of this soil has been cleared. About 65 percent of the acreage is in row crops, 34 percent is in pasture, and only 1 percent is in trees. Capability unit 3 (A7-IIw-1); woodland suitability group 6.

Collins silt loam, local alluvium (0 to 3 percent slopes) (Co).—This soil is in narrow drainageways of the hilly parts of the county and along the foot of bluffs at the edge of the delta. The soil is in local alluvium that recently washed from hills covered with loess.

In most places this soil has more rapid runoff and better surface drainage than Collins silt loam, as well as slower infiltration. Water generally does not stand for long periods. The layers of this soil vary more in texture than those in Collins silt loam, and they generally contain more sand. A few small areas on slopes of 3 to 5 percent are included.

This soil is well suited to row crops, pasture, and trees. About 65 percent of the acreage is in row crops, 34 percent is in pasture, and 1 percent is in trees. Capability unit 3 (A7-IIw-1); woodland suitability group 6.

Cuthbert Series

The Cuthbert series consists of moderately well drained, strongly acid to very strongly acid soils that formed in clayey material of the Coastal Plain. These soils are on upland slopes of 12 to 35 percent.

The surface layer is brown fine sandy loam. The subsoil is strong-brown to yellowish-red clay loam that is underlain by stratified, mottled clay.

Occurring with the Cuthbert soils are the Providence, Ruston, and Eustis soils. The Cuthbert soils lack the thin mantle of loess and the fragipan of the Providence soils and are more clayey and less sandy than the Ruston and Eustis soils.

The Cuthbert soils in this county are in the eastern part on steep slopes. Most of the acreage is wooded. These soils are mapped with the Providence soils in one undifferentiated soil group.

Cuthbert and Providence soils, 12 to 35 percent slopes, eroded (CpF2).—Cuthbert and Providence soils make up this mapping unit. About 75 percent of the acreage is Cuthbert soils, and most of the rest is Providence soils. The major layers of a Cuthbert fine sandy loam are:

0 to 4 inches, brown, very friable fine sandy loam with very dark gray mottles.
4 to 7 inches, yellowish-brown, very friable fine sandy loam.
7 to 27 inches, yellowish-red, firm sandy clay loam or clay loam with dark-red mottles.
27 to 44 inches, mottled, yellowish-red, red, and gray, firm clay.

The Providence soils are described generally later in this report. The major layers of a Providence silt loam are:

0 to 5 inches, dark-brown, friable silt loam.
5 to 24 inches, brown to yellowish-brown, friable silt loam.
24 to 47 inches, mottled, yellowish-brown, dark-brown, and light-gray silt loam or loam; compact, brittle, and hard.

Included with these soils are small areas of slightly eroded soils and small areas of severely eroded soils.

These soils are low in organic-matter content and in natural fertility. Runoff is rapid, but internal drainage is variable.

About 95 percent of the acreage is in trees; the rest is in pasture. These soils are well suited to trees but are not suited to pasture or to row crops. Capability unit 29 (A3–VIIe–4); woodland suitability group 3.

Dowling Series

In this series are poorly drained, strongly acid, fine-textured soils on flats or in depressions of the delta. These soils formed in alluvium. Some of this alluvium was washed in by the Mississippi River and deposited in slack-water areas, and some was washed from higher soils. The slope ranges from 0 to 2 percent.

In most places the surface layer of these soils is dark-gray silty clay loam to very plastic clay. The subsoil is gray or light-gray, very plastic clay.

The Dowling soils occur with the Alligator soils and are similar to them in color and texture, but not in position. The Dowling soils are in depressions and are slightly below the Alligator soils, which are on broad flats.

In Panola County the Dowling soils are on the delta. They extend from the west-central to the northwestern part of the county. About 45 percent of the acreage is in row crops, 5 percent is in pasture, and 50 percent is in trees. The main row crops are soybeans and cotton.

Dowling silty clay and clay (0 to 2 percent slopes) (Do).—These are poorly drained, fine-textured soils on flats or in depressions of the delta. The major layers in an area of silty clay are as follows:

0 to 6 inches, dark-gray, firm, very plastic silty clay with brown mottles.
6 to 28 inches, gray, firm, very sticky clay with brown mottles.
28 to 47 inches, gray to light-gray, firm, very plastic clay with strong-brown and brown mottles.

Surface drainage is very slow, and in wet periods runoff from higher soils ponds on these soils. When the soils are wet, infiltration and internal drainage are very slow. These soils shrink when they dry and crack so much that plants are damaged. Natural fertility is high. Because these soils are generally wet or dry, applied fertilizer is not effectively used by plants.

About 45 percent of the acreage is in row crops, 5 percent is in pasture, and 50 percent is in trees. Hay and pasture are fairly well suited, but planting row crops is risky. Water oak, cypress, willow, and other water-tolerant trees grow well. Capability unit 21 (A8–Vw–1); woodland suitability group 2.

Eustis Series

The Eustis series consists of somewhat excessively drained soils that formed in coarse-textured sediments of the Coastal Plain. In this county these soils are mapped with the Ruston and Providence soils in an undifferentiated soil group. Eustis soils resemble the Ruston soils in color but are sandier throughout the profile. They are sandier and more excessively drained than the Providence soils.

Falaya Series

This series consists of somewhat poorly drained, strongly acid to very strongly acid soils that developed in silty alluvium on nearly level bottom lands. The slope ranges from 0 to 3 percent.

Generally, the plow layer is brown silt loam and the subsoil is mottled, gray and brown silt loam.

The Falaya soils occur with the Collins and the Waverly soils. They are better drained and browner than the Waverly soils but are not so well drained as the Collins. The mottles in the Falaya soils are not so close to the surface as those in the Waverly soils but are closer to the surface than those in the Collins soils.

Falaya soils are scattered throughout most of this county. About 63 percent of the acreage is in row crops, 30 percent is in pasture, and 7 percent is in trees. The principal row crops are cotton and corn.

Falaya silt loam (0 to 2 percent slopes) (Fa). This is a somewhat poorly drained, nearly level soil on bottom lands. The major layers are:

0 to 7 inches, brown, friable silt loam.
7 to 12 inches, mottled, brown and light brownish-gray, friable silt loam.
12 to 43 inches, light-gray silt loam with strong-brown mottles.

Included with this soil are very small areas in which the lower subsoil is silty clay.

This soil has slow internal drainage and a moderate available water-holding capacity. Its content of organic matter is low. A plowpan forms readily in cultivated areas.

Most of this soil has been cleared. About 66 percent of the acreage is in row crops, 30 percent is in pasture, and 4 percent is in trees. The soil is well suited to pasture and hardwood trees and is fairly well suited to row crops. Capability unit 9 (A7–IIIw 1); woodland suitability group 5.

Falaya silt loam, local alluvium (0 to 3 percent slopes) (Fl).—This soil occupies narrow drainageways in the hilly parts of the county and is on the delta at the foot of bluffs. The soil developed in local alluvium that recently washed from nearby hills covered with loess.

This soil is not likely to be flooded for long periods. It generally has slightly more rapid runoff and better surface drainage than Falaya silt loam, as well as slower infiltration. The soil layers vary more in texture than those in Falaya silt loam and, in some places, contain a little more sand. A few small areas with slopes of 3 to 5 percent are included.

About 75 percent of the acreage is in row crops, 19 percent is in pasture, and 6 percent is in trees. This soil is well suited to pasture and hardwood trees and is fairly well suited to row crops. Capability unit 9 (A7–IIIw–1); woodland suitability group 5.

Falaya silty clay loam (0 to 2 percent slopes) (Fs).—This soil has a finer textured surface layer than Falaya silt loam and a subsoil that ranges from silt loam to silty clay loam. It is well suited to pasture and hardwood trees and is fairly well suited to row crops. About 20 percent of this soil is in row crops, 10 percent is in pasture, and 70 percent is in trees. Capability unit 10 (A7–IIIw–2); woodland suitability group 5.

Falaya and Waverly silt loams (0 to 2 percent slopes) (Fw).—Falaya silt loam and Waverly silt loam make up

this mapping unit. The Falaya soil makes up about half of the total acreage, and the Waverly soil most of the rest. The Falaya soil in this undifferentiated group is similar to the one described for the series. Waverly soils are described generally later in this report. The main layers of Waverly silt loam are:

- 0 to 6 inches, dark-gray, friable silt loam with light-gray mottles.
- 6 to 38 inches, light-gray, friable silt loam with strong-brown mottles.
- 38 to 60 inches, gray, friable silt loam with yellowish-brown mottles.

Included with these soils are very small areas that have a lower subsoil of silty clay. These soils occur in the eastern part of the delta. They extend from the bluffs at the foot of hills for about 3 miles westward.

Infiltration is moderate to fairly slow, and the available water-holding capacity is moderate to low. The organic-matter content and natural fertility are low. If these soils were cultivated, a plowpan would form readily.

These soils are in trees and are best suited to that use or to pasture. Sweetgum, water oak, and other water-tolerant trees are suited. Capability unit 19 (A7–IVw–1); woodland suitability group 5.

Grenada Series

The Grenada series consists of moderately well drained, strongly acid to very strongly acid soils that developed on uplands in thick deposits of loess. The slope ranges from 0 to 12 percent.

Generally, these soils have a brown or dark-brown silt loam plow layer, a brown or dark-brown heavy silt loam subsoil, and a fragipan at a depth of about 24 inches.

The Grenada soils occur with the Memphis, Loring, Calloway, and Henry soils. They are not so well drained as the Memphis and Loring soils but are better drained than the Calloway and Henry soils. The fragipan in the Grenada soils is nearer the surface than that in the Loring soils.

In this county the Grenada soils are scattered throughout the hilly parts, but they are most extensive in the less sloping north-central part. About 40 percent of the total acreage is in row crops, 47 percent is in pasture, and 13 percent is in trees. The principal row crops are cotton and corn.

Grenada silt loam, 2 to 5 percent slopes, eroded (GrB2).—This is a moderately well drained soil on uplands. It has a fragipan at a depth of about 23 inches. The major layers are:

- 0 to 5 inches, dark-brown, friable silt loam.
- 5 to 23 inches, brown, friable silt loam.
- 23 to 53 inches, mottled, yellowish-brown, brown, and gray silt loam; compact and brittle.

Internal drainage is moderate above the fragipan and is very slow within it. The available water-holding capacity is moderate. The soil is easy to work, but it tends to crust and pack if it is bare. In a few small areas the subsoil is exposed, and in cultivated areas a plowpan forms readily. Though the organic-matter content is low, natural fertility is fairly high.

Row crops, trees, and pasture are well suited to this soil. About 60 percent of the acreage is in row crops, 35 percent is in pasture, and 5 percent is in trees. Capability unit 2 (A7–IIe–5); woodland suitability group 7.

Grenada silt loam, 0 to 2 percent slopes (GrA).—The surface layer of this gently sloping soil is generally about 7 inches thick. The surface layer is not so fine textured as that in Grenada silt loam, 2 to 5 percent slopes, eroded, and the fragipan is slightly deeper. The nearly level soil has slower runoff than the gently sloping, eroded soil, and more rapid infiltration. An occasional rill indicates that erosion is only slight.

This soil is suited to row crops, trees, and pasture. Acreages of row crops and pasture are about equal. Capability unit 4 (A7–IIs–1); woodland suitability group 7.

Grenada silt loam, 2 to 5 percent slopes (GrB).—The surface layer of this soil is thicker than that of Grenada silt loam, 2 to 5 percent slopes, eroded, and not so fine textured. Slight erosion is indicated by an occasional rill.

This soil is well suited to row crops, trees, and pasture. About 55 percent of the acreage is in row crops, 40 percent is in pasture, and 5 percent is in trees. Capability unit 2 (A7–IIe–5); woodland suitability group 7.

Grenada silt loam, 2 to 5 percent slopes, severely eroded (GrB3).—All or nearly all of the original surface layer has been removed from this soil through erosion, and the subsoil is exposed. The plow layer, therefore, consists mostly of subsoil material that is mixed with remnants of the surface soil. The plow layer is browner and finer textured than that in Grenada silt loam, 2 to 5 percent slopes, eroded, and the fragipan generally is nearer the surface. Runoff is more rapid, and infiltration is slower.

This soil is suited to pasture and trees but is only fairly well suited to row crops. It should be kept in vegetation continuously because of the erosion hazard. About 54 percent of the acreage is used for row crops, 44 percent for pasture, and 2 percent for trees. Capability unit 8 (A7–IIIe 7); woodland suitability group 7.

Grenada silt loam, 5 to 8 percent slopes, eroded (GrC2).—This soil has more rapid runoff than Grenada silt loam, 2 to 5 percent slopes, eroded, and slower infiltration. The surface layer has washed away in a few small areas, and the subsoil is exposed. Included with this soil are a few very small, slightly eroded areas.

About 25 percent of the acreage is in row crops, 25 percent is in pasture, and 50 percent is in trees. Pasture and trees are well suited, and row crops are fairly well suited. Capability unit 7 (A7–IIIe–4); woodland suitability group 7.

Grenada silt loam, 5 to 8 percent slopes, severely eroded (GrC3).—All or nearly all of the original surface layer has been removed from this soil by rapid runoff. In most areas the subsoil is exposed. In other areas the plow layer is mostly subsoil material that is mixed with remnants of the surface layer. The plow layer is browner and slightly finer textured than that in Grenada silt loam, 2 to 5 percent slopes, eroded, and the fragipan is generally closer to the surface.

Unless this soil is kept in plants, further erosion is likely. The soil is well suited to pasture and trees, and occasionally it may be used for row crops. About 50 percent of the acreage is in row crops, 48 percent is in pasture, and 2 percent is in trees. Capability unit 17 (A7–IVe–5); woodland suitability group 7.

Grenada silt loam, 8 to 12 percent slopes, eroded (GrD2).—This strongly sloping soil has more rapid runoff than Grenada silt loam, 2 to 5 percent slopes, eroded. In a few small areas the runoff has washed away the original surface soil and has exposed the subsoil.

About 7 percent of this soil is in row crops, 8 percent is in pasture, and 85 percent is in trees. The soil is well suited to pasture and trees and occasionally may be used for row crops. Capability unit 18 (A7–IVe–6) ; woodland suitability group 7.

Grenada silt loam, 8 to 12 percent slopes, severely eroded (GrD3).—All or nearly all of the original surface layer of this soil has been removed through erosion. Consequently, the subsoil is exposed in many places. In other places the plow layer is a mixture consisting mostly of subsoil material and partly of remnants of the surface soil. The present surface layer is browner and finer textured than that of Grenada silt loam, 2 to 5 percent slopes, eroded. Runoff is more rapid, and the fragipan generally is closer to the surface.

The rapid runoff continues to wash away this soil unless it is protected by vegetation. Pasture and trees are well suited, and row crops can be grown occasionally. About 15 percent of this soil is used for row crops, 80 percent for pasture, and 5 percent for trees. Capability unit 24 (A7–VIe–4) ; woodland suitability group 7.

Guin Series

In the Guin series are choppy, rough, well-drained to excessively drained soils that formed in hilly areas of the Coastal Plain and consist almost entirely of acid gravel and sand. In this county these soils are mapped with Memphis and Natchez soils in an undifferentiated unit. Guin soils are coarser textured and more excessively drained than the Memphis and Natchez soils.

Gullied Land

This land consists of areas that are very severely eroded, severely gullied, or both. It accounts for about 25 percent of the total acreage in the county and occurs throughout the hilly part. This land is not suited to row crops.

Gullied land, sandy (Gs).—This land consists of sandy and clayey, gullied areas of Coastal Plain material and small areas of loessal material. Between the gullies the surface soil and generally much of the subsoil have washed away. Most gullies cannot be crossed by farm machinery.

Nearly all of this land has been cleared, cultivated, and later abandoned. It is in trees, is idle, or is in pasture. Pine trees are the best use, but if carefully managed, pasture may be established. Row crops are not suited. Capability unit 27 (A7–VIIe–2) ; woodland suitability group 4.

Gullied land, silty (Gu).—This land consists of loessal material that is 4 to 30 feet thick. Between the gullies the surface soil and generally much of the subsoil have been washed away. In most places farm machines cannot cross the gullies.

Nearly all of this land has been cleared, cultivated, and later abandoned. It now is in trees, is idle, or is pastured. Pine trees are suited, and pasture may be established if it is managed carefully. Row crops are not suited. Capability unit 27 (A7–VIIe–2) ; woodland suitability group 4.

Henry Series

This series consists of poorly drained, strongly acid to very strongly acid soils that developed in thick loess on old stream terraces in the uplands. The slope ranges from 0 to 2 percent.

The surface layer of these soils is very dark grayish-brown silt loam, and the subsoil is gray silt loam mottled with brown. The mottles begin within 6 inches of the surface. A fragipan occurs at a depth of about 23 inches.

The Henry soils occur with the Memphis, Loring, Grenada, and Calloway soils, which are better drained than the Henry soils and have a browner subsoil.

In Panola County the Henry soils are scattered in small areas throughout the loessal uplands. Most of the acreage is in pasture and trees.

Henry silt loam (0 to 2 percent slopes) (He).—This soil is on flats or in depressions of uplands. It is poorly drained and has a fragipan. The major layers are:

0 to 6 inches, gray silt loam.
6 to 23 inches, light brownish-gray, friable silt loam with brown and strong-brown mottles.
23 to 45 inches, mottled, strong-brown and gray silt loam; compact and brittle.

Included with this soil is a very small acreage of brown, overwashed Henry silt loam.

Internal drainage is moderate in the upper part of the subsoil but is very slow in the fragipan. This soil has low available water-holding capacity, low organic-matter content, and poor aeration.

Pasture and trees are best suited to this soil, but row crops can be grown occasionally. About 15 percent of the acreage is in row crops, 40 percent is in pasture, and 45 percent is in trees. Capability unit 20 (A7–IVw–2); woodland suitability group 8.

Loring Series

The Loring series consists of moderately well drained to well drained, strongly acid to very strongly acid soils that developed in thick loess on uplands. The slope ranges from 2 to 35 percent.

The surface layer of these soils is dark grayish-brown to brown silt loam, and the subsoil is brown heavy silt loam or light silty clay loam. A fragipan has formed at a depth of about 30 inches.

Occurring with the Loring soils are the Memphis, Grenada, Calloway, and Henry soils. The Loring soils are not so well drained as the Memphis soils, which lack a fragipan. They are better drained than the Grenada, Calloway, and Henry soils and are deeper to the fragipan.

In this county the Loring soils occur throughout the hilly part. About 40 percent of their acreage is in row crops, 40 percent is in pasture, and 20 percent is in trees. The main row crops are cotton and corn, and the trees are mostly mixed native hardwoods. Loblolly pine is planted in steep and eroded areas that are not suited to other plants.

Loring silt loam, 2 to 5 percent slopes, eroded (LoB2).—This is a moderately well drained to well drained, gently sloping soil on uplands. The major layers are:

0 to 5 inches, brown, friable silt loam.
5 to 33 inches, brown, friable silt loam or silty clay loam with strong-brown mottles below 27 inches.
33 to 54 inches, mottled, brown, yellowish-brown, and strong-brown, compact silt loam.

Included with this soil are a few very small, slightly eroded areas.

Internal drainage is moderate above the fragipan and is very slow within it, but enough available moisture can be held to meet the need of plants. This soil is low in organic-matter content and is moderate in natural fertility. With good management it is well suited to row crops, but a plowpan readily forms. It is also well suited to trees and pasture. Almost all of the soil is in pasture and row crops. Capability unit 1 (A7–IIe–1); woodland suitability group 9.

Loring silt loam, 2 to 5 percent slopes, severely eroded (LoB3).—All or nearly all of the original surface layer of this soil has been removed through erosion. The plow layer consists mostly of subsoil material that has been mixed with remnants of the surface soil. It is browner and finer textured than the plow layer of Loring silt loam, 2 to 5 percent slopes, eroded, and the fragipan generally is closer to the surface. The depth to the fragipan in this soil is about 28 inches.

This soil has more rapid runoff and slower infiltration than the less eroded Loring silt loam. Further erosion is likely unless close-growing plants are kept on the surface.

About 45 percent of this soil is used for row crops, 45 percent for pasture, and 10 percent for trees. Grass and trees are suited, and row crops are fairly well suited. Capability unit 5 (A7–IIIe–1); woodland suitability group 9.

Loring silt loam, 5 to 8 percent slopes (LoC).—Because this soil has more rapid runoff than Loring silt loam, 2 to 5 percent slopes, eroded, it is more susceptible to erosion in cultivated fields. Most areas, however, are not cultivated and have a surface soil that is 8 inches thick.

About 10 percent of the acreage is in row crops, 15 percent is in pasture, and 75 percent is in trees. This soil is suited to pasture and to trees, but it is only fairly well suited to row crops. Capability unit 6 (A7 IIIe–2); woodland suitability group 9.

Loring silt loam, 5 to 8 percent slopes, eroded (LoC2).—Runoff is more rapid on this soil than it is on Loring silt loam, 2 to 5 percent slopes, eroded. In a few small areas subsoil material is at the surface.

About 30 percent of this soil is used for row crops, 50 percent for pasture, and 20 percent for trees. Pasture and trees are suitable, but row crops produce only fair yields. Capability unit 6 (A7-IIIe–2); woodland suitability group 9.

Loring silt loam, 5 to 8 percent slopes, severely eroded (LoC3).—This soil has lost all or nearly all of its original surface layer through erosion. The plow layer consists mostly of subsoil material that has been mixed with remnants of the surface soil. It is browner and finer textured than the plow layer of Loring silt loam, 2 to 5 percent slopes, eroded. The fragipan generally is closer to the surface and is at a depth of 28 to 30 inches. Runoff is more rapid.

Because runoff is rapid, this soil is susceptible to further erosion unless it is protected by growing plants. The soil is suited to pasture and trees and is fairly well suited to row crops. About 30 percent of the acreage is in row crops, 55 percent is in pasture, and 15 percent is in trees. Capability unit 5 (A7–IIIe–1); woodland suitability group 9.

Loring silt loam, 8 to 12 percent slopes (LoD).—Because this soil has more rapid runoff than Loring silt loam, 2 to 5 percent slopes, eroded, it is more susceptible to erosion in cultivated fields. Most areas, however, are not cultivated and have a surface soil that is 8 to 10 inches thick.

About 5 percent of this soil is in row crops, 15 percent is in pasture, and 80 percent is in trees. The soil is well suited to pasture and to trees. Row crops may be grown occasionally. Capability unit 16 (A7–IVe–2); woodland suitability group 9.

Loring silt loam, 8 to 12 percent slopes, eroded (LoD2).—This soil has more rapid runoff than Loring silt loam, 2 to 5 percent slopes, eroded, and in a few small areas subsoil material is exposed. Further erosion is likely in cultivated fields.

About 15 percent of this soil is used for row crops, 35 percent for pasture, and 50 percent for trees. The soil is well suited to pasture and trees, but row crops should be grown only occasionally. Capability unit 16 (A7 IVe-2); woodland suitability group 9.

Loring silt loam, 8 to 12 percent slopes, severely eroded (LoD3).—All or nearly all of the original surface layer of this soil has been removed through erosion. The plow layer is mostly subsoil material that is mixed with remnants of the surface soil. The surface layer is browner and finer textured than that of Loring silt loam, 2 to 5 percent slopes, eroded, and the runoff rate is more rapid. The fragipan is closer to the surface and is generally at a depth of about 28 to 30 inches. Erosion is a hazard unless this soil has a good cover.

Pasture and trees are well suited to this soil, and an occasional row crop can be grown. About 15 percent of the acreage is in row crops, 65 percent is in pasture, and 20 percent is in trees. Capability unit 15 (A7 IVe–1); woodland suitability group 9.

Loring silt loam, 12 to 17 percent slopes, eroded (LoE2).—Runoff is more rapid on this soil than it is on Loring silt loam, 2 to 5 percent slopes, eroded. In a few small areas, the subsoil is exposed. Further erosion is likely if fields are cultivated. Included with this soil are a few areas that are only slightly eroded.

About 1 percent of this soil is in row crops, 55 percent is in pasture, and 44 percent is in trees. The soil is well suited to pasture and trees but is not suited to row crops. Capability unit 22 (A7–VIe–1); woodland suitability group 9.

Loring silt loam, 12 to 17 percent slopes, severely eroded (LoE3).—This soil has lost all or nearly all of its original surface layer through erosion. The plow layer consists mostly of subsoil material that has been mixed with remnants of the surface soil. It is browner and finer textured than the plow layer of Loring silt loam, 2 to 5 percent slopes, eroded, and has more rapid runoff. The fragipan generally is closer to the surface and is at a depth of about 28 inches. The rapid runoff erodes this soil where it is not protected by growing plants.

The soil is well suited to trees and, if carefully managed, may be used for pasture. About 2 percent of the acreage is in row crops, 55 percent is in pasture, and 43 percent is in trees. Capability unit 22 (A7–VIe–1); woodland suitability group 9.

Memphis Series

In the Memphis series are well-drained, strongly acid to very strongly acid soils that developed in thick loess on uplands. The slope ranges from 0 to 35 percent.

The surface layer of these soils is dark grayish-brown to brown silt loam. The subsoil generally is brown or dark brown heavy silt loam to light silty clay loam.

The Memphis soils occur with the Loring, Grenada, Calloway, and Henry soils, which have a fragipan and are not so well drained as the Memphis.

In this county the Memphis soils are in the western part of the hilly area. They are mainly on bluffs that border the delta. About 10 percent of their acreage is used for row crops, 20 percent for pasture, and 70 percent for trees. The row crops are mainly cotton and corn, and the trees are mixed native hardwoods. Loblolly pine is planted in some of the steep or eroded areas.

Memphis silt loam, 2 to 5 percent slopes, eroded (MeB2).—This is a well-drained, gently sloping soil on uplands. The main layers of a typical profile are:

0 to 4 inches, brown, friable silt loam.
4 to 19 inches, brown, friable silt loam or silty clay loam.
19 to 53 inches, brown, friable silt loam.

This soil has moderate internal drainage and available water-holding capacity. The content of organic matter is low, but natural fertility is moderate. A plowpan forms readily in cultivated areas. In a few areas the subsoil is exposed.

This soil is well suited to cultivation if it is managed well. It produces good yields of row crops, trees, and pasture. About 45 percent of the acreage is in row crops, 40 percent is in pasture, and 15 percent is in trees. Capability unit 1 (A7–IIe–1); woodland suitability group 9.

Memphis silt loam, 2 to 5 percent slopes, severely eroded (MeB3).—This soil has lost all or nearly all of its original surface layer through erosion. The plow layer is mostly subsoil material that has been mixed with remnants of the surface soil. It is browner and finer textured than the plow layer of Memphis silt loam, 2 to 5 percent slopes, eroded. Runoff is more rapid.

About 45 percent of this soil is in row crops, 52 percent is in pasture, and 3 percent is in trees. Pasture and trees are suited, but other crops are only fairly well suited. Capability unit 5 (A7–IIIe–1); woodland suitability group 9.

Memphis silt loam, 5 to 8 percent slopes, severely eroded (MeC3).—All or nearly all of the original surface layer has been removed from this soil through erosion. The subsoil is exposed in most places. The plow layer consists mainly of subsoil material that has been mixed with remnants of the surface soil and is browner and finer textured than that of Memphis silt loam, 2 to 5 percent slopes, eroded. The more sloping, severely eroded soil has more rapid runoff.

About 30 percent of this soil is in row crops, 65 percent is in pasture, and 5 percent is in trees. Pasture and trees are suited, and row crops are fairly well suited. Capability unit 5 (A7 IIIe–1); woodland suitability group 9.

Memphis and Loring silt loams, 17 to 35 percent slopes, eroded (MlF2).—Memphis silt loam and Loring silt loam make up this mapping unit. About 60 percent of the acreage is Memphis soil, and most of the rest is Loring soil. The Memphis soil in this undifferentiated soil group is similar to the one described for the series. The main layers of the Loring soil are:

0 to 6 inches, dark-brown, friable silt loam.
6 to 30 inches, brown, friable silt loam.
30 to 59 inches, brown silt loam with yellowish-brown mottles; compact and brittle.

Included with these soils are small, slightly eroded areas and a few areas where the subsoil is exposed.

These soils are on steep slopes in the western part of the hilly area. They occur with Memphis, Natchez, and Guin soils, 17 to 40 percent slopes, eroded. They are more silty than the Guin soils, which are gravelly and sandy. The Memphis and Loring soils have more strongly developed subsoil layers and are more acid than the Natchez soils. The Natchez soils commonly are alkaline in the upper layers. The Loring soils have a fragipan, but the Memphis, Natchez, and Guin soils do not.

Memphis and Loring silt loams, 17 to 35 percent slopes, eroded, are moderate in natural fertility but are low in organic-matter content. They are moderately permeable and are moderate in available water-holding capacity. Because they are steep, these soils are highly susceptible to erosion.

About 1 percent of the acreage is in row crops, 5 percent is in pasture, and 94 percent is in trees. This soil is best suited to trees, but under very careful management, it can be used for pasture. Row crops are not suited. Capability unit 25 (A7–VIIe–1); woodland suitability group 9.

Memphis and Loring silt loams, 17 to 35 percent slopes, severely eroded (MlF3).—All or nearly all of the original surface layer of these soils has been removed through erosion. The surface layer now consists mainly of subsoil material that has been mixed with the remaining surface soil. The surface layer is browner and finer textured than that of Memphis and Loring silt loams, 17 to 35 percent slopes, eroded. Runoff is more rapid. The fragipan in the severely eroded Loring soil is generally closer to the surface than that in the less eroded soil.

About 1 percent of the acreage is used for row crops, 10 percent for pasture, and 89 percent for trees. These soils are best suited to trees, but they can be used for pasture if they are carefully managed. They are not suited to row crops. Capability unit 25 (A7–VIIe–1); woodland suitability group 9.

Memphis, Natchez, and Guin soils, 17 to 40 percent slopes, eroded (MnF2).—Memphis, Natchez, and Guin soils make up this mapping unit. About 50 percent of the acreage is Memphis soil, about 30 percent is Natchez soil, and about 20 percent is Guin soil. The Memphis soil in this undifferentiated soil group is similar to the one described for the series. The Natchez soils are described generally later in this report. The major layers of a representative Natchez silt loam are:

0 to 6 inches, dark-brown, friable silt loam.
6 to 18 inches, brown, friable silt loam.
18 to 66 inches, yellowish-brown, friable silt loam.

A description of the Guin soils has been given earlier in the report. The major layers of a typical profile are:

0 to 5 inches, dark-brown, friable gravelly silt loam.
5 to 30 inches, mottled, dark-red, yellowish-red, pale-yellow, and dark reddish-brown gravelly silt loam.
30 to 50 inches, mottled, dark reddish-brown, pale-yellow, and strong-brown gravelly fine sandy loam.

Included with these soils are very small areas of Eustis soils, of Loring soils, and of clayey materials. Many gravel pits are in the same general area as are these soils.

These soils are in the western part of the county on the bluffs adjacent to the delta. They occur with the steep Memphis and Loring silt loams. Unlike the Loring soils, the Memphis, Natchez, and Guin soils do not have a fragipan. The Guin soils formed in acid, gravelly and sandy material of the Coastal Plain, but in some places, they are alkaline instead of acid. The Memphis, Natchez, and Loring soils formed in thick loess. The Natchez soil has a weaker structure than the Memphis soil and is shallower to alkaline material.

These steep soils have low to moderate available water-holding capacity. Runoff is rapid, and erosion is a severe hazard unless cover is maintained. The content of organic matter is low, and natural fertility is low to high.

Although these soils are best suited to trees, they may be used for pasture if they are carefully managed. Row crops are not suited. About 1 percent of the acreage is in row crops, 2 percent is in pasture, and 97 percent is in trees. Capability unit 28 (A7 VIIe 4); woodland suitability group 9.

Mixed Alluvial Land

This land consists of alluvium that washed from areas of loess and from sandy areas of the Coastal Plain. It is strongly acid and somewhat poorly drained to excessively drained. The land is on stream bottoms that range in slope from 0 to 3 percent. The layers vary in texture and thickness and are strata of silty and sandy material. The sandy material ranges from coarse sand to sandy loam, and the silty material generally is silt loam. In some places gravel is also present.

This land occurs with the Collins, Falaya, and Waverly soils. It varies much more in texture than those soils but is more sandy and, therefore, more excessively drained.

In Panola County this land is on the delta near bluffs in areas where overflowing streams have deposited mixed sandy and silty material. In the eastern part of the county, it is at the base of steep slopes where sandy material has washed from the hills and mixed with silty material.

About 45 percent of this land is in row crops, 35 percent is in pasture, and 20 percent is in trees.

Mixed alluvial land (0 to 3 percent slopes) (Mx).—This is a somewhat poorly drained to excessively drained, acid soil on bottom lands. The main layers are:

0 to 5 inches, brown, friable sandy loam.
5 to 15 inches, yellowish-brown, loose very fine sand.
15 to 45 inches, stratified sand and silt.

This land varies between silt loam and coarse sand. There is no uniformity in the arrangement, depth, color, or thickness of the soil layers.

This soil is droughty and very low in organic-matter content and in natural fertility. Internal drainage ranges from rapid to slow.

About 45 percent of this soil is in row crops, 35 percent is in pasture, and 20 percent is in trees. The soil is suited to row crops, pasture, and hardwood trees, but because it varies in texture and drainage, it has not been placed in a capability unit. Woodland suitability group 6.

Natchez Series

The Natchez series consists of somewhat excessively drained soils that formed in thick beds of calcareous loess. These soils occur in small areas with Memphis soils on or near the bluffs along the Mississippi River. In this county these soils are mapped with Memphis and Guin soils in an undifferentiated unit. Natchez soils are less acid than Memphis soils and are calcareous at a much shallower depth. They are not so coarse textured as Guin soils.

Providence Series

The Providence series consists of moderately well drained soils that have a fragipan. These soils formed in loess, 2 to 4 feet thick, that overlies sandy material of the Coastal Plain. In this county Providence soils are mapped with Ruston and Eustis soils in an undifferentiated soil group. Providence soils are not so excessively drained as the Ruston soils, which do not have a fragipan. They are not so coarse textured or so excessively drained as the Eustis soils. Providence soils are also mapped with the Cuthbert soils in an undifferentiated soil group, but they have a thicker and more permeable root zone than those soils.

Ruston Series

In the Ruston series are well-drained, strongly acid soils that developed in sandy, Coastal Plain material on uplands. The slope ranges from 12 to 35 percent.

The surface layer of these soils is very dark grayish-brown fine sandy loam, and the subsoil is yellowish-red to red sandy clay loam.

The Ruston soils occur with the Providence, Eustis, and Cuthbert soils. The Ruston soils contain more sand and less clay than the Cuthbert soils, lack the thin, loessal mantle and the fragipan of the Providence soils, and are more strongly developed than the Eustis soils.

In this county the Ruston soils are on steep slopes in the eastern part and are mapped only in undifferentiated soil groups with the Providence and the Eustis soils.

Ruston, Providence, and Eustis soils, 17 to 35 percent slopes, eroded (RpF2).—Ruston, Providence, and Eustis soils make up this mapping unit. About 50 percent of the acreage is Ruston soils, about 30 percent is Providence soils, and about 20 percent is Eustis soils. The major layers of a Ruston soil are:

0 to 11 inches, dark yellowish-brown, friable fine sandy loam.
11 to 34 inches, red, friable sandy clay loam.
34 to 51 inches, mottled, dark-red, reddish-brown, and yellowish red, loose loamy sand.

The Providence soils have been described generally earlier in this report. The major layers of a typical profile are:

0 to 2 inches, dark yellowish-brown, friable silt loam.
2 to 22 inches, strong-brown, friable silty clay loam.
22 to 32 inches, mottled, strong-brown, light brownish-gray, and brown, friable to firm silt loam; compact and brittle.
32 to 61 inches, stratified loam and fine sandy loam material that is mottled with brownish yellow, strong brown, and white.

The Eustis soils have also been described generally earlier in the report. The major layers are:

0 to 5 inches, mottled, brown, and light yellowish-brown, loose sandy loam.
5 to 43 inches, strong-brown, loose loamy sand.

Included with these soils are some slightly eroded areas and a few severely eroded areas.

Further erosion is likely unless slopes are protected by close-growing plants. The available water-holding capacity is low to moderate, and runoff is medium to rapid. The organic-matter content and natural fertility are low.

About 1 percent of the acreage is in row crops, 2 percent is in pasture, and 97 percent is in trees. Trees are best suited. Capability unit 26 (A3–VIIe–1); woodland suitability group 3.

Ruston, Providence, and Eustis soils, 12 to 17 percent slopes, eroded (RpE2).—Ruston, Providence, and Eustis soils make up this mapping unit. About 50 percent of the acreage is Ruston soils, about 30 percent is Providence soils, and about 20 percent is Eustis soils. Included with these soils are areas of slightly eroded soils and a few areas of severely eroded soils. In a few small areas, the subsoil is exposed.

Runoff is less rapid on these soils than on Ruston, Providence, and Eustis soils, 17 to 35 percent slopes, eroded.

About 1 percent of the acreage is used for row crops, 2 percent for pasture, and 97 percent for trees. These soils are best suited to trees. Capability unit 23 (A3–VIe–1); woodland suitability group 3.

Waverly Series

The Waverly series consists of poorly drained, strongly acid soils that developed in alluvium on nearly level bottom lands. The alluvium washed from areas of loess. Slopes range from 0 to 2 percent.

The surface layer of these soils is dark-gray silt loam mottled with gray or light gray. It is underlain by gray heavy silt loam and silt loam.

These soils occur with the Collins, Falaya, and Henry soils but are not so well drained or so brown as the Collins and Falaya soils and are mottled closer to the surface. Though they are on bottom lands instead of uplands, the Waverly soils resemble the Henry soils in color and drainage.

The largest area of the Waverly soils in this county is on the delta adjacent to the bluffs in the west-central part of the county. Many very small areas are scattered throughout the county.

About 15 percent of the acreage in these soils is in row crops, 25 percent is in pasture, and 60 percent is in trees. Soybeans are the main row crop.

Waverly silt loam (0 to 2 percent slopes) (Wa).—This is a poorly drained, acid, nearly level soil on bottom lands. It has slow internal drainage and a generally low available moisture-holding capacity. The organic-matter content and natural fertility are low. The main layers of a typical profile are:

0 to 7 inches, dark-gray, friable silt loam with gray mottles.
7 to 37 inches, light-gray, friable silt loam with strong-brown mottles.
37 to 57 inches, gray, slightly sticky silt loam with yellowish-brown and strong-brown mottles.

Included with this soil near the bluffs at the edge of the delta are a few small areas that are alkaline in the lower part of the subsoil. In some small areas, the lower subsoil is silty clay instead of silt loam.

About 15 percent of this soil is in row crops, 25 percent is in pasture, and 60 percent is in trees. The soil is best suited to pasture and to sweetgum, water oak, and a few other trees. Soybeans are fairly well suited. Capability unit 19 (A7–IVw–1); woodland suitability group 10.

Use and Management of Soils

This section discusses the use and management of soils for crops and pasture, in engineering works, as woodland, and as wildlife habitats.

Crops and Pasture [1]

In the first part of this subsection, capability grouping is explained. In the second, the soils of the county are placed in capability units and the use and management of these units are discussed. The third part consists of tables that list estimated yields of the principal crops and of pasture.

Capability groups of soils

The capability classification is a grouping of soils that shows, in a general way, how suitable soils are for most kinds of farming. It is a practical grouping based on limitations of the soils, on the risk of damage when they are used, and on the way they respond to treatment.

In this system all the kinds of soil are grouped at three levels, the capability class, subclass, and unit. Eight capability classes are in the broadest grouping and are designated by Roman numerals I through VIII. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other seven classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, shallow, or otherwise limited that, without major reclamation, they do not produce worthwhile yields of crops, forage, or wood products.

The subclasses indicate major kinds of limitations within the classes. Within most of the classes there can be as many as four subclasses. The subclass is indicated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless a close-growing plant cover is maintained; *w* means that water in or on the soil will interfere with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow,

[1] T. R. TAYLOR, management agronomist, assisted in writing this subsection.

droughty, or stony or has low fertility that is difficult to correct; and *c*, used in only some parts of the country, indicates that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few or no limitations. Class V can contain, at the most, only subclasses *w*, *s*, and *c*, because the soils in it have little or no erosion hazard but have other limitations that limit their use largely to pasture, range, woodland, or wildlife.

Within the subclasses are the capability units, groups of soils enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally identified by numbers assigned locally, for example, IIe-1 or IIIe-2. The numbers are not consecutive in Panola County, because not all of the capability units used in Mississippi occur in this county. The soils in each capability unit have about the same hazards and limitations of use and require about the same treatment.

Soils are classified in capability classes, subclasses, and units in accordance with the degree and kind of their permanent limitations. Not considered in this classification are major and generally expensive landforming that would change the slope, depth, or other characteristics of the soil, and not considered are possible but unlikely major projects of reclamation.

None of the soils in Panola County have been placed in class I or class VIII. The classes, subclasses, and capability units in this county are described in the list that follows.

Class I. Soils that have few limitations that restrict their use.

Class II. Soils that have some limitations that reduce the choice of plants or require moderate conservation practices.

Subclass IIe. Soils subject to moderate erosion if they are not protected.

Capability unit 1 (A7-IIe-1).—Well drained and moderately well drained, acid, eroded silt loams on gently sloping uplands.

Capability unit 2 (A7-IIe-5).—Moderately well drained, acid, slightly eroded and moderately eroded silt loams on gently sloping uplands.

Subclass IIw. Soils that have moderate limitations because of excess water.

Capability unit 3 (A7-IIw 1).—Moderately well drained, acid, silt loams on nearly level bottom lands.

Subclass IIs. Soils that have moderate limitations because of moisture capacity.

Capability unit 4 (A7-IIs-1).—Moderately well drained, acid, slightly eroded silt loam on nearly level uplands.

Class III. Soils that have severe limitations that reduce the choice of plants, or require special conservation practices, or both.

Subclass IIIe. Soils subject to severe erosion if they are cultivated and not protected.

Capability unit 5 (A7-IIIe-1).—Well drained and moderately well drained, acid, severely eroded silt loams on gently sloping to moderately sloping uplands.

Capability unit 6 (A7-IIIe-2).—Well drained and moderately well drained, acid, slightly eroded or moderately eroded silt loams on moderately sloping uplands.

Capability unit 7 (A7-IIIe-4).—Moderately well drained, acid, severely eroded silt loam on gently sloping uplands.

Capability unit 8 (A7-IIIe-7).—Moderately well drained, acid, severely eroded silt loam on gently sloping uplands.

Subclass IIIw. Soils that have severe limitations because of excess water.

Capability unit 9 (A7-IIIw-1).—Somewhat poorly drained, acid, silt loams on nearly level bottom lands.

Capability unit 10 (A7-IIIw-2).—Somewhat poorly drained, acid, fine-textured silty clay loam on nearly level bottom lands.

Capability unit 11 (A7-IIIw-4).—Somewhat poorly drained, acid, slightly eroded silt loams on nearly level to gently sloping uplands.

Capability unit 12 (A8-IIIw-5).—Poorly drained, acid, slightly eroded silty clay loams on level or nearly level, low bottoms of the delta; underlain by heavy clay.

Capability unit 13 (A8-IIIw-7).—Poorly drained, acid, slightly eroded silt loam on nearly level, low bottoms of the delta; underlain by heavy clay.

Capability unit 14 (A8-IIIw-11).—Poorly drained, acid, slightly eroded, heavy clays on level or nearly level, low bottoms of the delta.

Class IV. Soils that have very severe limitations that restrict the choice of plants, require very careful management, or both.

Subclass IVe. Soils subject to very severe erosion if they are cultivated and not protected.

Capability unit 15 (A7-IVe-1).—Well drained and moderately well drained, acid, severely eroded silt loam on strongly sloping uplands.

Capability unit 16 (A7-IVe-2).—Well drained and moderately well drained, acid, slightly eroded or eroded silt loams on strongly sloping uplands.

Capability unit 17 (A7-IVe-5).—Moderately well drained, acid, severely eroded silt loam on moderately sloping uplands.

Capability unit 18 (A7-IVe-6).—Moderately well drained, eroded silt loam on strongly sloping uplands.

Subclass IVw. Soils that have very severe limitations for cultivation, because of excess water.

Capability unit 19 (A7-IVw-1).—Somewhat poorly drained and poorly drained, acid, slightly eroded or uneroded silt loams on nearly level bottom lands.

Capability unit 20 (A7-IVw-2).—Poorly drained, acid, slightly eroded silt loam on nearly level uplands.

Class V. Soils not likely to erode that have other limitations, impractical to remove without major reclama-

tion, that limit their use largely to pasture, hay, or woodland.

Subclass Vw. Soils too wet for cultivation; drainage or protection not feasible.

Capability unit 21 (A8–Vw–1).—Poorly drained, acid, heavy silty clay and clay in level or depressional areas of the delta.

Class VI. Soils that have severe limitations that make them generally unsuitable for cultivation and that limit their use largely to pasture or woodland.

Subclass VIe. Soils severely limited, chiefly by risk of erosion if protective cover is not maintained.

Capability unit 22 (A7–VIe–1).—Well drained and moderately well drained, acid, eroded or severely eroded silt loams on steeply sloping uplands.

Capability unit 23 (A3–VIe–1). Excessively drained to moderately well drained, acid, slightly or severely eroded, sandy and silty soils on steeply sloping uplands.

Capability unit 24 (A7–VIe–4).—Moderately well drained, acid, severely eroded silt loam on strongly sloping uplands.

Class VII. Soils that have very severe limitations that make them unsuitable for cultivation without major reclamation, and that restrict their use largely to grazing, woodland, or wildlife.

Subclass VIIe. Soils very severely limited, chiefly by risk of erosion if protective cover is not maintained.

Capability unit 25 (A7–VIIe–1).—Well drained and moderately well drained, acid, slightly to severely eroded silt loams on very steeply sloping uplands.

Capability unit 26 (A3–VIIe–1).—Excessively drained to moderately well drained, acid, eroded, sandy and silty soils on very steeply sloping uplands.

Capability unit 27 (A7–VIIe–2).—Severely eroded and gullied land.

Capability unit 28 (A7–VIIe–4).—Excessively drained to well drained, acid to alkaline, eroded soils on very steeply sloping uplands; silty, sandy, and gravelly soil material.

Capability unit 29 (A3–VIIe–4).—Moderately well drained and somewhat poorly drained, acid, eroded soils on very steeply sloping uplands; silty and clayey soil material.

Class VIII. Soils and landforms that have limitations that preclude their use, without major reclamation, for commercial production of plants, and that restrict their use to recreation, wildlife, water supply, or esthetic purposes.

Capability units in Panola County

In this subsection, the soils of the county are placed in capability units and suitable uses and management practices are suggested for each unit.

CAPABILITY UNIT 1 (A7–IIe–1)

This capability unit consists of well drained and moderately well drained, acid, eroded soils on gently sloping uplands. These soils are—

Memphis silt loam, 2 to 5 percent slopes, eroded.
Loring silt loam, 2 to 5 percent slopes, eroded.

Figure 3.—**Corn on soil in capability unit 1. Sericea lespedeza preceded the corn.**

The silt loam surface layer of these soils is 4 to 6 inches thick. The subsoil is heavy silt loam to light silty clay loam. A fragipan occurs in the Loring soils at a depth of about 30 inches.

The soils in this group are easy to work, but they crust and pack if they are bare. They erode readily unless protected. Except in the fragipan of the Loring soil, where water moves very slowly, the internal drainage of these soils is moderate. The available water-holding capacity is adequate to meet the needs of plants. The content of organic matter is low, and natural fertility is moderate. In cultivated areas a plowpan forms readily and may limit plant roots and moisture to the top 8 or 10 inches.

These soils respond well to management that provides additions of organic matter, of complete fertilizer, and of lime. The organic matter can be increased by using sod crops and turning under cover crops. An increase of organic matter improves soil structure and increases the infiltration rate, the moisture-holding capacity, and the activity of bacteria. Organic matter also helps to reduce runoff and the crusting and packing of the surface soil. Lime and a complete fertilizer are needed for continuous high yields.

With an adequate water-disposal system, these soils may be cultivated continuously to clean-tilled crops. Without an adequate water-disposal system, clean-tilled crops and close-growing crops that improve the soil may be grown in about equal amounts. With or without an adequate water-disposal system, the soils require fertilizer and crop residue.

Crops well suited to these soils are cotton, corn (fig. 3), small grain, and lespedeza. Well suited for pasture are crimson clover, alfalfa, bermudagrass, bahiagrass, and ryegrass. Dallisgrass, tall fescue, and white clover are only fairly well suited for pasture. Pine and hardwood trees grow well.

CAPABILITY UNIT 2 (A7–IIe–5)

In this capability unit are moderately well drained, acid, slightly eroded and moderately eroded soils on gently sloping uplands. The soils are—

Grenada silt loam, 2 to 5 percent slopes.
Grenada silt loam, 2 to 5 percent slopes, eroded.

Figure 4.—**Soybean residue left on Collins silt loam in capability unit 3 after the beans were harvested.**

The silt loam surface layer of these soils is 4 to 6 inches thick. The subsoil is heavy silt loam. A fragipan occurs at a depth of about 24 inches.

The soils in this group are easy to work, but they crust and pack if they are bare. They are likely to erode unless protected. Internal drainage is moderate above the fragipan but is very slow within it. The available water-holding capacity, however, is adequate to meet the needs of plants. Although the content of organic matter is low, natural fertility is fairly high. A plowpan forms readily and may permit roots and moisture to penetrate only to a depth of 8 or 10 inches.

These soils respond well to good management that provides additions of organic matter, lime, and fertilizer. The organic matter can be increased by using a sod crop or by turning under a cover crop. An increase in organic matter improves soil structure and increases the infiltration rate and the activity of bacteria. Additions of lime and a complete fertilizer help to maintain a high level of fertility.

With an adequate water-disposal system, the soils in this group can be cultivated continuously to clean-tilled crops. Without an adequate water-disposal system, clean-tilled crops and close-growing crops that improve the soil can be grown in about equal amounts. Whether or not an adequate water-disposal system is provided, these soils require additions of fertilizer and the use of crop residue.

Crops well suited to these soils are cotton, annual lespedeza, sericea lespedeza, and small grain. Sorghum, corn, and soybeans are fairly well suited row crops. Well suited for pasture are bermudagrass, ryegrass, crimson clover, and bahiagrass. Dallisgrass, tall fescue, and white clover are fairly well suited for pasture. Pine and hardwood trees grow well.

CAPABILITY UNIT 3 (A7–IIw–1)

This capability unit consists of moderately well drained, acid, nearly level, alluvial soils. The soils are—

Collins silt loam.
Collins silt loam, local alluvium.

Although these soils have a silt loam surface layer and subsoil, the subsoil is somewhat finer textured than the surface layer.

The soils in this group are easily worked, but they crust and pack if they are bare. The content of organic matter is low. Ordinarily, internal drainage is rapid and a large amount of water is available to plants. But a plowpan forms readily in these soils, and it may restrict the internal drainage, the moisture available in the layer above the pan, and the growth of plant roots. In many places streambanks cave in, and water flows onto these soils from higher land.

If organic matter is maintained and increased, it improves soil structure and increases the infiltration rate and the activity of bacteria. It also reduces crusting and packing. Organic matter can be increased by using sod crops, by adding large amounts of fertilizer, and by managing crop residue well (fig. 4). Lime, a complete fertilizer, and additional nitrogen should be added in amounts indicated by soil tests.

With an adequate water-disposal system, the soils in this unit can be cultivated continuously to clean-tilled crops. Without an adequate water-disposal system, clean-tilled crops and close-growing crops that improve the soil can be cultivated in about equal amounts. Whether or not a water-disposal system is provided, additions of fertilizer and good use of crop residue are required if the soils are cultivated.

Crops well suited to these soils are cotton (fig. 5), corn, small grain, truck crops, and sorghum. Well suited for pasture (fig. 6) are dallisgrass, bermudagrass, tall fescue, lespedeza, white clover, and red clover. Hardwoods of good quality grow well. Pine trees grow well, but areas planted to pine generally revert to hardwoods after the first harvest.

CAPABILITY UNIT 4 (A7–IIs–1)

Grenada silt loam, 0 to 2 percent slopes, is the only soil in this capability unit. It occurs on nearly level uplands and is moderately well drained, acid, and slightly eroded. The surface layer is silt loam, and the subsoil is heavy silt loam. A fragipan occurs at a depth of about 27 inches.

This soil is easy to work, but it crusts and packs if it is bare. Internal drainage is moderate above the fragipan but is very slow within it. The capacity to hold available water, however, is adequate. This soil contains only a small amount of organic matter but is high in natural fertility. A plowpan forms readily at a depth of 6 or 8 inches, and it may restrict internal drainage, available

Figure 5.—**Cotton on Collins silt loam in capability unit 3.**

Figure 6.—Registered cattle grazing pasture on soil in capability unit 3. The pasture is a mixture of dallisgrass, bermudagrass, ryegrass, white clover, and wild winter peas.

moisture, and the growth of plant roots. In periods of heavy rainfall, surface water may be excessive.

This soil should be managed so that organic matter and fertility are maintained. Adding organic matter improves soil structure and increases the infiltration rate and the activity of bacteria. It also reduces the crusting and packing of the surface soil. The use of sod crops and other cover crops helps to maintain or increase the content of organic matter. Lime and a complete fertilizer should be added to keep productivity high.

With an adequate water-disposal system, this soil can be cultivated continuously to clean-tilled crops. Without an adequate water-disposal system, clean-tilled crops and close-growing crops may be grown in about equal amounts. Whether or not water is adequately disposed of, cultivated fields require additions of fertilizer and good use of crop residue.

Well suited to this soil are cotton, annual lespedeza, and small grain. Sorghum, corn, soybeans, and sericea lespedeza are fairly well suited. Suitable for pasture are bermudagrass, dallisgrass, ryegrass, white clover, and bahiagrass. Crimson clover is fairly well suited. Pines and hardwoods grow well.

CAPABILITY UNIT 5 (A7-IIIe-1)

This capability unit consists of well drained and moderately well drained, acid, severely eroded soils that are on gently sloping to moderately sloping uplands. These soils are—

Loring silt loam, 2 to 5 percent slopes, severely eroded.
Loring silt loam, 5 to 8 percent slopes, severely eroded.
Memphis silt loam, 2 to 5 percent slopes, severely eroded.
Memphis silt loam, 5 to 8 percent slopes, severely eroded.

The silt loam surface layer of these soils is underlain by heavy silt loam to light silty clay loam. A fragipan has formed in the Loring soils at a depth of about 28 to 30 inches.

Erosion is the main hazard on these soils. The soils are fairly easy to work, but they crust and pack if they are bare. Internal drainage is moderate, but enough available moisture can be held to meet the needs of plants. Although the content of organic matter is low, natural fertility is fairly high.

These soils respond well to good management. This management should provide a plant cover as much of the time as is practical so that the soils are protected from further erosion. Organic matter improves soil structure and increases the infiltration rate and the activity of bacteria. It also reduces runoff and the crusting and packing of the surface layer. The use of sod crops and other cover crops help to maintain or increase the organic matter. A complete fertilizer and lime are required to maintain a high level of productivity.

With an adequate water-disposal system, these soils can be used for row crops in a cropping system with close-growing crops if crop residue is managed well and enough fertilizer is added. The close-growing crops, however, should be kept on the soil most of the time. Without an adequate water-disposal system, these soils should be kept mainly in perennial vegetation.

Cotton, small grain, and sericea lespedeza are well suited to the soils in this group. Fairly well suited are corn, sorghum, annual lespedeza, and soybeans. Suitable for pasture are crimson clover, bermudagrass, ryegrass, and bahiagrass. Dallisgrass, lespedeza, and white clover are fairly well suited. Pines and hardwoods are well suited trees.

CAPABILITY UNIT 6 (A7-IIIe-2)

In this capability unit are well drained and moderately well drained, acid soils on moderately sloping uplands. These soils are slightly eroded or moderately eroded. They are—

Loring silt loam, 5 to 8 percent slopes.
Loring silt loam, 5 to 8 percent slopes, eroded.

The silt loam surface layer of these soils is underlain by heavy silt loam to light silty clay loam. A fragipan occurs at a depth of about 30 inches.

These soils are easily worked, but they crust and pack if left bare and are susceptible to further erosion. Internal drainage is moderate above the fragipan and is very slow within it, but the available water-holding capacity is generally adequate. Though the content of organic matter is low, natural fertility is high.

The soils in this group respond well to good management that provides continuous vegetation as much of the time as is practical. As a part of this management, add a complete fertilizer and lime. The organic matter can be maintained or increased by using sod crops and by turning under cover crops. Organic matter improves the soil structure and increases the activity of bacteria and the infiltration rate of water. It also reduces runoff, crusting, and packing. Lime and a complete fertilizer are needed for continuous high yields.

With an adequate water-disposal system, these soils can be used infrequently for clean-tilled crops if crop residue is managed well and enough fertilizer is added. But close-growing crops should be used most of the time. Without an adequate water-disposal system, these soils should be kept mainly in perennial vegetation.

Crops well suited to the soils in this group are cotton, small grain, orchard fruits, and sericea lespedeza. Fairly well suited are corn, sorghum, soybeans, and annual lespedeza. Bermudagrass, bahiagrass, ryegrass, and crimson

clover are fairly well suited for pasture. Pines and hardwoods grow well.

CAPABILITY UNIT 7 (A7–IIIe–4)

Grenada silt loam, 5 to 8 percent slopes, eroded, is the only soil in this capability unit. It is a moderately well drained, acid soil on moderately sloping uplands. The silt loam surface soil is underlain by heavy silt loam. A fragipan has formed at a depth of about 22 inches.

This soil is easy to work, but it crusts and packs if left bare and, unless protected, is likely to erode further. Internal drainage is moderate above the fragipan and very slow within it, but the available water-holding capacity is adequate. Though the content of organic matter is low, natural fertility is fairly high.

The soil in this group responds well to good management that keeps it in vegetation as much of the time as is practical. Additions of organic matter, fertilizer, and lime are needed. Organic matter can be maintained or increased by using sod crops and other cover crops and turning them under. The organic matter improves structure in the soil and reduces runoff, crusting, and packing. It also increases the infiltration rate and the activity of bacteria. Additions of lime and a complete fertilizer help to maintain a high level of productivity.

With an adequate water-disposal system, this soil can be used for clean-tilled crops in a long cropping system with close-growing crops if crop residue is managed well, enough fertilizer is added, and the close growing crops are kept on the soil most of the time. Without an adequate water-disposal system, this soil should be kept in perennial vegetation.

Sod crops are probably best suited to this soil, but row crops grow fairly well. Cotton, annual lespedeza, and small grain are well suited, and sorghum, corn, and soybeans are fairly well suited. Fairly suitable are bermudagrass, ryegrass, crimson clover, white clover, and sericea lespedeza. Pines and hardwoods are also well suited.

CAPABILITY UNIT 8 (A7–IIIe–7)

Grenada silt loam, 2 to 5 percent slopes, severely eroded, is the only soil in this capability unit. This is a moderately well drained, acid soil on gently sloping uplands. It has a silt loam surface soil, a heavy silt loam subsoil, and a fragipan at a depth of about 20 inches.

This soil is fairly easy to work, but it crusts and packs if it is bare and erodes readily unless protected. Water moves moderately well internally until it reaches the fragipan and then moves downward very slowly. The available water-holding capacity is fairly low. The content of organic matter is low and is hard to maintain, but natural fertility is fairly high.

The soil responds well to good management that keeps growing plants on it as much of the time as is practical. Additions of organic matter and a complete fertilizer are needed. Organic matter can be maintained or increased by seeding sod crops and other cover crops and turning them under. This practice improves the soil structure and increases the rate of infiltration and the activity of bacteria. It also reduces runoff and the crusting and packing of the surface soil. Additions of a complete fertilizer are needed for continued high yields.

With an adequate water-disposal system, this soil can be used occasionally for clean-tilled crops if crop residue is managed well and enough fertilizer is added. Most of the time, however, the soil should be kept in close-growing crops that improve and protect it. Without an adequate water-disposal system, the soil should be kept in perennial vegetation.

Sod crops are probably best suited to this soil, but row crops, especially cotton, and oats and wheat are fairly well suited. Corn, soybeans, and sorghum are also fairly well suited. Suitable for pasture are bermudagrass, bahiagrass, vetch, wild winter peas, and crimson clover. Pasture crops that produce fair yields are dallisgrass, annual and sericea lespedezas, and whiteclover, but tall fescue, millet, and sudangrass are not so well suited. Pine trees grow well.

CAPABILITY UNIT 9 (A7–IIIw–1)

This capability unit consists of somewhat poorly drained, acid, nearly level soils in alluvium on bottom lands. The soils are—

Falaya silt loam.
Falaya silt loam, local alluvium.

The silt loam surface layer of these soils is underlain by silt loam to light silty clay loam.

These soils occupy 13 percent of the county. They are easy to work, but they crust and pack if left bare. Because of their position they may be damaged by streambank cutting and by overfalls. Internal drainage is slow, and the available water-holding capacity is moderate. The content of organic matter is low, but natural fertility is fairly high. A plowpan forms readily and may restrict internal drainage, the supply of available moisture, and the growth of plant roots.

The content of organic matter should be maintained so that soil structure and infiltration are favorable. Organic matter also reduces crusting and packing of the soil and increases the activity of bacteria. Probably the best way to add organic matter is to use sod crops in the cropping system, to fertilize row crops at a high rate, and to manage crop residue well. A complete fertilizer and lime are needed to maintain a high level of productivity.

These soils may be used continuously for clean-tilled crops if (1) surface drainage is adequate, (2) backwater, floodwater, and sediment are controlled, (3) fertilization is appropriate, and (4) crop residue is managed well. Without these practices, the soil should be kept in perennial vegetation most of the time.

Corn, soybeans, and sorghum are well suited to the soils of this unit. Cotton and small grain are fairly well suited. Well suited for pasture are tall fescue, bermudagrass, dallisgrass, bahiagrass, whiteclover, and wild winter peas. Hardwoods of good quality grow well. Pine trees grow well, but hardwoods are better suited and generally take over after the first cutting.

CAPABILITY UNIT 10 (A7–IIIw–2)

The only soil in this capability unit—Falaya silty clay loam—is a somewhat poorly drained, acid, fine-textured soil on nearly level bottom lands. Its silty clay loam surface soil is underlain by silt loam to silty clay loam.

This soil is difficult to work and forms clods if cultivated when too wet. Because of its position next to streams, removal of excess surface and overflow water is likely to be a problem. Streambank cutting and overfalls are likely to cause damage. Because of the cloddy surface soil, a good stand of crops is often hard to obtain. Internal

Figure 7.—**Contour cultivation on Calloway silt loam.**

drainage is slow, and the available water-holding capacity is generally adequate. The organic-matter content is low.

This soil needs additions of organic matter, a complete fertilizer, and lime. Additional organic matter improves structure, increases the infiltration rate and activity of bacteria, and makes the soil easier to work. Probably the best way to add organic matter is to use sod crops in the cropping system. The fertilizer and lime are needed to maintain a high level of productivity. Seedbeds should be prepared in fall so that the soil will settle before seeds are planted.

The soil in this group may be used continuously for clean-tilled crops if (1) surface drainage is adequate, (2) backwater, floodwater, and sediment are controlled, (3) fertilization is appropriate, and (4) crop residue is managed well. Without these practices, the soil should be kept in perennial vegetation most of the time.

Soybeans, sorghum, and lespedeza are well suited, and cotton and corn are fairly well suited. Suitable for pasture are tall fescue, whiteclover, bermudagrass, and dallisgrass. Hardwoods are well suited, and areas planted to pine revert to hardwoods after the first cutting.

CAPABILITY UNIT 11 (A7–IIIw–4)

In this capability unit are somewhat poorly drained, acid, slightly eroded soils on nearly level to gently sloping uplands. The soils are—

Calloway silt loam, 0 to 2 percent slopes.
Calloway silt loam, 2 to 5 percent slopes.

The silt loam surface layer of these soils is underlain by heavy silt loam. A fragipan occurs at a depth of about 16 inches.

These soils are easy to work, but they crust and pack if left bare. Internal drainage is moderate above the fragipan but is very slow within it. Because the fragipan is near the surface, the available water-holding capacity in the root zone is low. These soils are often too wet or too dry for the preparation of seedbeds and the growth of plants. They are low in organic-matter content and in natural fertility. A plowpan forms readily and may limit the effective depth for plant roots and moisture to the top 8 or 10 inches of soil.

The soils in this unit need organic matter, a complete fertilizer, and lime. Sod crops and cover crops in the cropping system help to maintain and increase the organic matter. The organic matter, in turn, improves soil structure and increases the infiltration rate and the activity of bacteria. It also reduces crusting and packing of the surface layer. Fertilizer and lime help to maintain or improve the level of productivity. Contour cultivation reduces runoff and erosion and thus saves moisture (fig. 7).

With an adequate water-disposal system, these soils can be used for clean tilled crops in a cropping system with close-growing crops if crop residue is managed well and enough fertilizer is added. The close growing crops, however, should be kept on the soil most of the time. Without an adequate water-disposal system, these soils should be kept mainly in perennial vegetation.

These soils are best suited to pasture but are fairly well suited to row crops. Well suited pasture plants are bermudagrass, bahiagrass, wild winter peas, whiteclover, and annual lespedeza. Tall fescue, dallisgrass, sericea lespedeza, sudangrass, and millet are fairly well suited. Sorghum grows well, and cotton, corn, soybeans, and small grain grow fairly well. Pines and a few kinds of hardwoods are suited.

CAPABILITY UNIT 12 (A8–IIIw–5)

This capability unit consists of poorly drained, acid, slightly eroded, fine-textured soils that are on level or nearly level, low bottoms of the delta. They are

Alligator silty clay loam, 0 to ½ percent slopes.
Alligator silty clay loam, ½ to 2 percent slopes.

The silty clay loam surface layer of these soils is underlain by silty clay or clay.

These soils are difficult to work and generally cannot be prepared for planting row crops until late in spring. Further cultivation during the growing season is often delayed after rains. Internal drainage is slow, the available water-holding capacity is fairly low, and the content of organic matter is low. The soils readily form a plowpan and are likely to crack during dry periods.

Organic matter can be maintained or increased in these soils by using sod in the cropping system. Organic matter improves structure and makes the soils easier to work. It also increases the infiltration rate, speeds up the activity of bacteria, and reduces crusting and packing of the surface layer. Deep cultivation, as well as bedding to obtain surface drainage, is beneficial. The beds should be high enough to permit drainage and aeration.

With an adequate water-disposal system, these soils can be used continuously for clean-tilled crops if adequate fertilizer is added and crop residue is well managed. Without an adequate water-disposal system, the soils should be kept in perennial vegetation.

Pasture and hay are probably best suited to the soils in this unit. Many other crops can be grown, but planting them on these low soils is somewhat risky because of flooding. Suitable crops in some fields are soybeans, annual lespedeza, rice, small grain, vetch, wild winter peas, and sorghum. Sudangrass and millet are fairly well suited. Cotton is also fairly well suited, but corn and alfalfa are not. Suitable for pasture are bermudagrass, johnsongrass, and winter legumes; fairly well suited are tall fescue, dallisgrass, white and red clovers, and summer grasses. Sweetgum, water oak, white oak, and red oak are suitable trees.

CAPABILITY UNIT 13 (A8-IIIw-7)

Alligator silt loam, overwash, ½ to 2 percent slopes, is the only soil in this capability unit. It occurs on nearly level, low bottoms of the delta and is poorly drained, acid, and slightly eroded. The silt loam surface soil is underlain by silty clay or clay.

This soil is difficult to work and generally cannot be prepared for planting row crops until late in spring. Further cultivation during the growing season is often delayed after rains. Internal drainage is slow, the available water-holding capacity is fairly low, and the organic-matter content is low. A plowpan forms readily.

This soil needs additional organic matter, which can be provided by planting sod crops. Additional organic matter improves the soil structure and increases the infiltration rate and the activity of bacteria. It also reduces crusting and packing and makes the soil easier to work. Deep cultivation, as well as bedding to obtain surface drainage, is beneficial. The beds should be high enough to permit drainage and aeration.

With an adequate water-disposal system, this soil can be used continuously for clean-tilled crops if it is adequately fertilized and crop residue is managed well. Without an adequate water-disposal system, the soil should be kept in perennial vegetation most of the time.

Many plants are suited to this soil, but pasture and hay are probably best suited. Because water is excessive, planting row crops is risky. Nevertheless, many fields are in row crops. Soybeans, small grain, rice, and sorghum are suited to some fields. Corn, cotton, sudangrass, millet, and annual lespedeza are fairly well suited. Suitable for pasture are bermudagrass, tall fescue, dallisgrass, white clover, and wild winter peas. Red clover, vetch, and alfalfa are only fairly well suited. Sweetgum and water oak are suitable trees.

CAPABILITY UNIT 14 (A8-IIIw-11)

The soils in this capability unit are poorly drained, acid, slightly eroded, and fine textured. They occur on level or nearly level, low bottoms of the delta. The soils are—

Alligator clay, 0 to ½ percent slopes.
Alligator clay, ½ to 2 percent slopes.

These soils have a heavy, plastic clay surface soil and subsoil.

The soils in this group are very difficult to manage, and they produce low yields unless drainage is adequate. When they are wet, these plastic soils seal over, puddle, and are poorly aerated. When they dry, they crack so severely that the roots of some plants may be injured. The soils can be cultivated within only a narrow range of moisture content. Infiltration and internal drainage are very slow, and the available water-holding capacity is moderately low. Though these soils contain little organic matter, their natural fertility generally is high. Crop yields are highest in moderately dry years.

These soils should be prepared early in spring if they are to have a seedbed that is firm enough for planting. Though natural fertility is generally high, additions of nitrogen are needed and additions of phosphate and potash may be needed. The use of sod in the cropping system will add organic matter and thus improve the structure, increase the infiltration rate and activity of bacteria, and make the soils easier to work.

With an adequate water-disposal system, clean-tilled crops can be grown continuously if fertilization is appropriate and crop residue is managed well. Without an adequate water-disposal system, the soils should be kept in perennial vegetation most of the time.

Well suited to the soils in this group are pasture, hay, and other close-growing crops. But a good stand of some row crops can be obtained, if the soils are drained. Well-suited crops in drained areas are soybeans, rice, small grain, vetch, wild winter peas, and sorghum. Cotton is fairly well suited, but planting it is risky. Millet and annual lespedeza are fairly well suited. Corn is poorly suited. Suitable for pasture are bermudagrass, dallisgrass, tall fescue, and white clover. Sudangrass and red clover are fairly suitable. Sweetgum, water oak, hackberry, elm, and ash are suitable trees.

CAPABILITY UNIT 15 (A7-IVe-1)

Loring silt loam, 8 to 12 percent slopes, severely eroded, is the only soil in this capability unit. It is a well drained or moderately well drained, acid soil on strongly sloping uplands. Its silt loam surface soil is underlain by heavy silt loam to light silty clay loam. A fragipan occurs at a depth of about 28 to 30 inches.

This soil is fairly easy to work, but it erodes readily unless protected and crusts and packs if left bare. Runoff is rapid, and the available water-holding capacity is moderate. Internal drainage is moderate above the fragipan but is very slow within it. Though the organic-matter content is low, natural fertility is fairly high.

To protect this soil from further erosion, a plant cover should be maintained as much of the time as is practical. The soil needs additional organic matter, a complete fertilizer, and lime. Organic matter can be maintained or increased by planting sod crops. Additional organic matter improves soil structure, increases the infiltration rate and activity of bacteria, and reduces runoff, crusting, and packing. To maintain a high level of productivity, add fertilizer and lime. If the soil is wooded, the trees should be protected from fire and grazing.

The soil in this unit should be used dominantly for perennial vegetation. Sod crops or trees are probably the best use, but row crops may occasionally be planted. Cotton, small grain, and sericea lespedeza are well suited crops, and corn, sorghum, annual lespedeza, and soybeans are fairly well suited. Well suited for pasture are bermudagrass, bahiagrass, and crimson clover, but dallisgrass and white clover are poorly suited. Pine trees are well suited, but hardwoods are not.

CAPABILITY UNIT 16 (A7-IVe-2)

This capability unit consists of well drained and moderately well drained, acid, slightly eroded or eroded soils on strongly sloping uplands. The soils are—

Loring silt loam, 8 to 12 percent slopes.
Loring silt loam, 8 to 12 percent slopes, eroded.

The silt loam surface layer of these soils is underlain by heavy silt loam to light silty clay loam. A fragipan has formed at a depth of about 30 inches.

Unless they are protected, the soils in this group erode readily. They are fairly easy to work, but they crust and pack if left bare. Internal drainage is moderate above the fragipan and is very slow within it, but the available water-holding capacity is adequate. Though these soils

contain little organic matter, they are fairly high in natural fertility.

Under good management, growing plants are kept on these soils as much of the time as is practical to protect them from erosion. Also needed are additions of organic matter so that soil structure is improved and the infiltration rate and the activity of bacteria are increased. Organic matter can be maintained or increased by growing sod crops. Additions of fertilizer and lime are needed for continued high yields. If these soils are wooded, the trees should be protected from fire and grazing.

These soils should be kept in perennial vegetation most of the time. Sod crops and trees are best suited, but row crops can be grown occasionally. Cotton, small grain, and sericea lespedeza are well suited, and corn, sorghum, and soybeans are fairly well suited. Well suited for pasture are bermudagrass, ryegrass, bahiagrass, and crimson clover. Dallisgrass and white clover grow fairly well. The soils in this unit are good for pine and hardwood trees.

CAPABILITY UNIT 17 (A7-IVe-5)

Grenada silt loam, 5 to 8 percent slopes, severely eroded, is the only soil in this capability unit. It is a moderately well drained, acid soil on moderately sloping uplands. The silt loam surface soil is underlain by a heavy silt loam subsoil. A fragipan occurs at a depth of 20 inches.

This soil is fairly easy to work, but it erodes readily unless protected and will crust and pack if left bare. Runoff is rapid, and the available water-holding capacity is fairly low. Internally, water moves moderately well above the fragipan but very slowly within it. This soil is low in organic matter content but is fairly high in natural fertility.

To help control further erosion, growing plants should be on this soil as much of the time as is practical. The soil also needs additional organic matter, a complete fertilizer, and lime. Sod crops in the cropping system help to maintain or increase organic matter. The organic matter improves soil structure, increases the infiltration rate and the activity of bacteria, and reduces runoff, crusting, and packing. A complete fertilizer and lime are needed for continued high yields.

With an adequate water-disposal system, this soil can be used for clean-tilled crops in a cropping system with close-growing crops if crop residue is managed well and enough fertilizer is added. The close growing crops, however, should be on the soil most of the time. Without an adequate water-disposal system, the soil should be kept mainly in perennial vegetation.

Though sod crops are best suited to this soil, a row crop can be planted occasionally. Cotton, annual lespedeza, and small grain are fairly well suited, but corn and soybeans are not suited. Well suited for pasture are bermudagrass, ryegrass, sericea lespedeza, and crimson clover. Dallisgrass, white clover, and tall fescue are poorly suited. Pine trees grow well.

CAPABILITY UNIT 18 (A7-IVe-6)

Grenada silt loam, 8 to 12 percent slopes, eroded, is the only soil in this capability unit. This soil is on strongly sloping uplands and is moderately well drained. The surface soil is silt loam and is underlain by heavy silt loam. A fragipan has formed at a depth of about 22 inches.

This soil is easy to work, but it crusts and packs when bare and erodes readily unless protected. Internal drainage is moderate above the fragipan and is very slow within it, but the available water-holding capacity is generally adequate. Though the organic-matter content is low, natural fertility is fairly high.

Under good management growing plants are kept on this soil as much of the time as is practical so that further erosion is controlled. Also needed are additions of organic matter, a complete fertilizer, and lime. The use of sod in the cropping system helps to maintain or increase the organic matter. Organic matter improves soil structure and increases the rate of infiltration and the activity of bacteria. It also helps to reduce runoff and the crusting and packing of the surface layer. A complete fertilizer and lime are needed to keep the level of productivity high.

This soil should be used mainly for perennial vegetation. Sod crops are best suited, but a row crop can be planted occasionally. Cotton, annual lespedeza, and small grain are well suited, and corn and soybeans are fairly well suited. Well suited for pasture are bermudagrass, ryegrass, crimson clover, annual lespedeza, and sericea lespedeza. Dallisgrass, white clover, and tall fescue are fairly well suited. Pine and hardwood trees grow well.

CAPABILITY UNIT 19 (A7-IVw-1)

This capability unit consists of somewhat poorly drained and poorly drained, acid, slightly eroded or uneroded soils on nearly level, wet bottom lands. The soils are—

Falaya and Waverly silt loams.
Waverly silt loam.

The silt loam surface layer of these soils is underlain by heavy silt loam.

Because these soils are wet, they are generally hard to work. When wet they should not be plowed and prepared for crops. In cultivated areas a plowpan forms readily, and the soils tend to be cloddy and to crust and pack if they are bare. The available water-holding capacity is low, and organic matter and natural fertility are low.

These soils need additions of organic matter, a complete fertilizer, and lime. Probably the best way to add organic matter is to use sod crops or other cover crops in the cropping system. Increased organic matter helps to improve soil structure and to increase the rate of infiltration and the activity of bacteria. It also reduces crusting and packing of the surface soil. Fertilizer and lime are needed to maintain a high level of productivity.

With an adequate water-disposal system, these soils can be used for row crops in a cropping system with close-growing crops if crop residue is managed well and enough fertilizer is added. The close-growing crops, however, should be grown most of the time. Without an adequate water-disposal system, these soils should be used mostly for perennial vegetation.

Though pasture is best suited to the soils in this group, row crops can be grown occasionally if they are well managed. Soybeans, sorghum, and oats are fairly well suited, but planting cotton and corn is generally risky. Well suited for pasture are annual lespedeza, whiteclover, and wild winter peas, and fairly well suited are dallisgrass, bermudagrass, bahiagrass, and vetch. Hardwood trees grow well on these soils.

CAPABILITY UNIT 20 (A7-IVw-2)

Henry silt loam is the only soil in this capability unit. This soil is on nearly level uplands and is poorly drained,

acid, and slightly eroded. The silt loam surface soil is underlain by silt loam to light silty clay loam. A fragipan has formed at a depth of about 20 inches.

This soil is fairly easy to work, but it crusts and packs if left bare. It generally is either too wet or too dry for cultivation, is poorly aerated, and readily forms a plowpan in cultivated areas. Internal drainage is moderate above the fragipan and very slow within it. The available water-holding capacity is low. The organic-matter content and natural fertility are also low.

This soil needs surface drainage, as well as added organic matter, a complete fertilizer, and lime. Sod used in the cropping system helps to maintain and increase the organic matter, and the organic matter improves soil structure and increases the infiltration rate and the activity of bacteria. Additional organic matter also reduces crusting and packing of the surface soil. The fertilizer and lime are needed to maintain a high level of productivity.

With an adequate water-disposal system, this soil can be used for row crops in a cropping system with close-growing crops. If row crops are grown, however, the soil should be kept mainly in the close-growing crops that improve and protect soil. Adequate fertilizer and good use of crop residue are needed. Without an adequate water-disposal system, this soil should be used mainly for perennial vegetation.

Grasses and legumes are best suited to the soil in this unit, but sweetpotatoes, sorghum, strawberries, and other specialty crops are well suited. Cotton, corn, and soybeans are fairly well suited. Well suited for pasture are bermudagrass and annual lespedeza; fairly well suited are dallisgrass, Coastal bermudagrass, whiteclover, and sericea lespedeza. Loblolly pine, sweetgum, and cherrybark oak grow fairly well.

CAPABILITY UNIT 21 (A8–Vw–1)

Dowling silty clay and clay are the only soils in this capability unit. These soils are poorly drained and acid. They are on flats and in depressions of the delta. The surface soil is mostly silty clay to very plastic clay and is underlain by very plastic clay. In some places the surface soil is silty clay loam.

Because these soils are on low bottoms, draining excess water is difficult. Surface drainage is very slow, drainage outlets are inadequate, and runoff from higher soils collects and ponds during wet periods. In spring and often during the growing season, cultivation and planting are delayed because the soils are wet and internal drainage is very slow. Then, when the soils dry, they shrink and crack so much that plants with fibrous roots may be damaged. These soils are high in organic-matter content and in natural fertility.

With an adequate water-disposal system, these soils can be cultivated, but the shortage of outlets limits water disposal systems to a few areas. When cultivated, the soils should be well fertilized with nitrogen and should be protected by good use of crop residue. Without an adequate water-disposal system, the soils should be kept in perennial vegetation.

Hay and pasture are fairly well suited to the soils in this group. Generally not suited are row crops, cotton, corn, and other crops that need a long growing season to mature. Rice is well suited, and sorghum, soybeans, and millet are fairly well suited. Well suited for pasture are tall fescue and bermudagrass, and fairly well suited are dallisgrass and white clover. Johnsongrass and red clover are not suited. Suitable trees are overcup oak, bitter pecan, cottonwood, willow, cypress, water tupelo, and swamp black tupelo.

CAPABILITY UNIT 22 (A7–VIe–1)

This capability unit consists of well drained and moderately well drained, acid soils on steeply sloping uplands. The soils are—

Loring silt loam, 12 to 17 percent slopes, eroded.
Loring silt loam, 12 to 17 percent slopes, severely eroded.

The silt loam surface layer of these soils is underlain by heavy silt loam to light silty clay loam. A fragipan occurs at a depth of about 30 inches.

These soils erode readily when not protected because runoff is rapid and infiltration is slow. Internal drainage is moderate above the fragipan and very slow within it, but the available water-holding capacity is adequate. Though these soils contain little organic matter, the natural fertility is fairly high.

Well-managed perennial vegetation should be maintained to protect these soils from further erosion, to reduce runoff, and to increase the infiltration rate and water-holding capacity. A complete fertilizer and lime are needed for pasture. Woodlands should be protected from fire and grazing.

Trees or pasture are best suited to the soils in this group. Row crops are not suited. Well suited for pasture are bermudagrass, annual lespedeza, sericea lespedeza, and kudzu. Pine and hardwood trees grow well.

CAPABILITY UNIT 23 (A3–VIe–1)

Ruston, Providence, and Eustis soils, 12 to 17 percent slopes, eroded, are the only soils in this capability unit. These soils occur on steeply sloping uplands and are excessively drained to moderately well drained, acid, and of varied texture. Erosion is slight to severe. A fragipan has formed in the Providence soil at a depth of about 20 to 24 inches.

These soils erode readily unless protected. Runoff is rapid, infiltration is moderate to rapid, and the available water-holding capacity is low to adequate. The organic-matter content is low. In the Providence soil, internal drainage is moderate to rapid above the fragipan and is very slow within it. In the Ruston and Eustis soils, internal drainage is moderate to rapid throughout.

Perennial vegetation, such as pasture or trees, should be maintained on these soils to protect them from further erosion. This cover helps to reduce the rate of runoff and to increase the infiltration rate and the water-holding capacity. Pasture needs a complete fertilizer and lime, and woodland needs protection from fire and grazing.

The soils in this group are best suited to woodland, especially of pine. They are not suited to row crops. Because the soil texture is so variable, the soils are generally not suited to pasture. They are, however, fairly well suited to bermudagrass, bahiagrass, sericea lespedeza, and kudzu.

CAPABILITY UNIT 24 (A7–VIe–4)

Grenada silt loam, 8 to 12 percent slopes, severely eroded, is the only soil in this capability unit. This soil is on uplands and is moderately well drained and acid.

The silt loam surface soil is underlain by heavy silt loam. A fragipan has formed at a depth of about 20 inches.

Because runoff is rapid, this soil erodes readily unless it is protected. Internal drainage is medium above the fragipan and very slow within it. The available water-holding capacity is fairly low. Natural fertility is fairly high, though the soil contains little organic matter.

Good management of this soil provides perennial vegetation to reduce the rate of runoff and to help protect the soil from further erosion. A complete fertilizer and lime should be added for pasture.

Pasture and trees are best suited to this soil. Row crops are not suited. Well suited for pasture are bermudagrass, ryegrass, annual lespedeza, sericea lespedeza, and crimson clover. Dallisgrass, white clover and tall fescue are poorly suited. Pine trees grow well.

CAPABILITY UNIT 25 (A7-VIIe-1)

This capability unit consists of well drained and moderately well drained, acid, slightly to severely eroded soils on very steeply sloping uplands. The soils are—

- Memphis and Loring silt loams, 17 to 35 percent slopes, eroded.
- Memphis and Loring silt loams, 17 to 35 percent slopes, severely eroded.

The silt loam surface layer of these soils is underlain by heavy silt loam. A fragipan occurs in the Loring soils at a depth of about 25 to 30 inches.

These soils erode readily unless protected. Though infiltration is slow, the available water-holding capacity is adequate. Internal drainage is moderate in the Memphis soils. It is moderate in the Loring soils above the fragipan and is very slow within it. The organic-matter content is low, but natural fertility is moderate.

Under good management permanent vegetation is kept on these soils to protect them from further erosion, to reduce the rate of runoff, and to increase infiltration and the water holding capacity. Pasture needs a complete fertilizer and lime. Woodland should be protected from fire and grazing.

The soils in this group are best suited to trees, especially to hardwoods. They may be used for pasture but not for row crops. Well-suited pasture plants are bermudagrass, annual lespedeza, sericea lespedeza, and kudzu.

CAPABILITY UNIT 26 (A3-VIIe-1)

Ruston, Providence, and Eustis soils, 17 to 35 percent slopes, eroded, are the only soils in this capability unit. These excessively drained to moderately well drained, acid soils are on very steeply sloping uplands. The soil layers vary in texture. A fragipan occurs in the Providence soils at a depth of about 20 to 24 inches.

These soils erode readily unless protected. Runoff is rapid, the infiltration rate is moderate to rapid, and the available water-holding capacity is low to adequate. Organic matter is low. Internal drainage is moderate to rapid in the Eustis and Ruston soils. It is moderate to good in the Providence soils above the fragipan but is very slow within it.

Under good management these soils are kept in perennial plants. These plants help to reduce runoff and to increase the infiltration rate and the water-holding capacity and thus help to protect the soils from further erosion. Trees are best suited to these soils. Row crops and pasture are not suited.

Figure 8.—**Pine trees planted on Gullied land.**

CAPABILITY UNIT 27 (A7-VIIe-2)

This capability unit, which makes up about 25 percent of the county, consists of Gullied land, sandy, and Gullied land, silty. The land is severely eroded and gullied. It is made up partly of Coastal Plain material and partly of loessal material. The surface soil and subsoil vary in texture.

Because of rapid runoff, erosion is a serious hazard. Infiltration is slow, the capacity to hold available water is limited, and the organic-matter content is low.

Well-managed, permanent plants should be provided to help prevent further erosion and reduce damage in low areas. The land is best suited to pine trees, and within the past 10 years, many areas have been planted to pine (fig. 8). The woodland should be protected from fire and grazing. Row crops and pasture are not suited to Gullied land.

CAPABILITY UNIT 28 (A7-VIIe-4)

This capability unit consists of Memphis, Natchez, and Guin soils, 17 to 40 percent slopes, eroded. These soils are excessively drained to well drained, are acid to alkaline, and are of varied texture. They are on very steep uplands, and the erosion hazard is slight to severe.

These soils erode readily unless they are protected. They have a rapid to fairly slow infiltration rate, a low to adequate available water-holding capacity, and high to low natural fertility.

The soils in this group need well-managed, permanent vegetation so that runoff and further erosion are reduced. Pine and hardwood trees are best suited, though these trees need continuous protection from fire, grazing, and damage through logging. Row crops and pasture are not suited to the soils in this group.

CAPABILITY UNIT 29 (A3-VIIe-4)

This capability unit consists of Cuthbert and Providence soils, 12 to 35 percent slopes, eroded. These moderately well drained and somewhat poorly drained, acid soils are on very steep uplands. The hazard of erosion is slight to severe. The surface soil and subsoil have variable texture. A fragipan has formed in the Providence soils at a depth of about 20 to 24 inches.

The soils in this group erode readily unless protected. Runoff is rapid, and infiltration and internal drainage are slow. To reduce the rate of runoff and thus protect these soils from further erosion, well-managed, permanent plants should be maintained. Pine trees are best suited to these soils, but these trees need continuous protection from fire, from grazing, and from damage through logging. Row crops and pasture plants are not suited.

Estimated yields

This subsection consists mainly of tables 2 and 3. Table 2 lists, for each soil in the county, estimated yields of the main field crops under improved management, which is defined in this subsection. Table 3 lists estimated yields of forage crops for groups of soils at high and low levels of fertilization and liming.

TABLE 2.—*Estimated average acre yields of principal crops under improved management*

[Under management commonly practiced in the county, yields are 25 to 35 percent less than those listed. Dashed lines indicate crop is not suited to soil or is not commonly grown on it]

Symbol on map	Soil	Corn	Cotton (lint)	Soybeans	Oats (grain)
		Bu.	*Lb.*	*Bu.*	*Bu.*
Aa	Alligator clay, 0 to ½ percent slopes	----	400	25	50
Ab	Alligator clay, ½ to 2 percent slopes	----	475	30	57
Ac	Alligator silt loam, overwash, ½ to 2 percent slopes	----	525	32	60
Ad	Alligator silty clay loam, 0 to ½ percent slopes	----	475	25	50
Ae	Alligator silty clay loam, ½ to 2 percent slopes	----	500	30	57
CaA	Calloway silt loam, 0 to 2 percent slopes	50	375	----	55
CaB	Calloway silt loam, 2 to 5 percent slopes	50	400	----	55
Cm	Collins silt loam	100	850	45	80
Co	Collins silt loam, local alluvium	100	850	45	80
CpF2	Cuthbert and Providence soils, 12 to 35 percent slopes, eroded	----	----	----	----
Do	Dowling silty clay and clay	----	350	25	40
Fa	Falaya silt loam	90	650	40	75
Fl	Falaya silt loam, local alluvium	90	650	40	75
Fs	Falaya silty clay loam	70	650	40	75
Fw	Falaya and Waverly silt loams	----	----	----	----
GrA	Grenada silt loam, 0 to 2 percent slopes	85	700	35	70
GrB	Grenada silt loam, 2 to 5 percent slopes	85	700	35	70
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded	60	675	35	70
GrB3	Grenada silt loam, 2 to 5 percent slopes, severely eroded	45	500	----	65
GrC2	Grenada silt loam, 5 to 8 percent slopes, eroded	45	500	----	62
GrC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded	35	400	----	55
GrD2	Grenada silt loam, 8 to 12 percent slopes, eroded	----	----	----	----
GrD3	Grenada silt loam, 8 to 12 percent slopes, severely eroded	----	----	----	----
Gs	Gullied land, sandy	----	----	----	----
Gu	Gullied land, silty	----	----	----	----
He	Henry silt loam	----	----	25	----
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded	85	750	40	70
LoB3	Loring silt loam, 2 to 5 percent slopes, severely eroded	55	675	----	65
LoC	Loring silt loam, 5 to 8 percent slopes	60	675	----	68
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded	50	650	----	62
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded	40	500	----	55
LoD	Loring silt loam, 8 to 12 percent slopes	----	----	----	55
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded	----	----	----	50
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded	----	----	----	45
LoE2	Loring silt loam, 12 to 17 percent slopes, eroded	----	----	----	----
LoE3	Loring silt loam, 12 to 17 percent slopes, severely eroded	----	----	----	----
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded	85	750	40	70
MeB3	Memphis silt loam, 2 to 5 percent slopes, severely eroded	55	675	----	65
MeC3	Memphis silt loam, 5 to 8 percent slopes, severely eroded	40	500	----	55
MlF2	Memphis and Loring silt loams, 17 to 35 percent slopes, eroded	----	----	----	----
MlF3	Memphis and Loring silt loams, 17 to 35 percent slopes, severely eroded	----	----	----	----
MnF2	Memphis, Natchez, and Guin soils, 17 to 40 percent slopes, eroded	----	----	----	----
Mx	Mixed alluvial land	40	400	----	65
RpE2	Ruston, Providence, and Eustis soils, 12 to 17 percent slopes, eroded	----	----	----	----
RpF2	Ruston, Providence, and Eustis soils, 17 to 35 percent slopes, eroded	----	----	----	----
Wa	Waverly silt loam	----	----	20	----

TABLE 3.—*Estimated yields of pasture and hay, by groups of soils, at high and low levels of liming and fertilization*

[N stands for nitrogen; P, for phosphorus; K, for potassium]

Symbol on map	Soil	Plants for pasture or hay	Annual fertilization	pH brought to—	Yields: Pasture	Yields: Hay (air dried)
			Pounds per acre		*Cow-acre-months* [1]	*Tons*
	Group 1:					
GrA	Grenada silt loam, 0 to 2 percent slopes.	Bahiagrass or common bermudagrass mixed with crimson clover, white clover, annual lespedeza, vetch, or wild winter peas.	High: N, 100; P, 60; K, 60 Low: N, 20; P, 10; K, 10	6.0 5.4	9.6 5.7	2.9 1.6
GrB	Grenada silt loam, 2 to 5 percent slopes.	Coastal bermudagrass mixed with crimson clover, white clover, annual lespedeza, vetch, or wild winter peas.	High: N, 100; P, 60; K, 60 Low: N, 20; P, 10; K, 10	6.0 5.2	12.1 8.0	4.0 1.6
GrB2 GrC2	Grenada silt loam, 2 to 5 percent slopes, eroded. Grenada silt loam, 5 to 8 percent slopes, eroded.	Oats, wheat, and ryegrass.	High: N, 150; P, 90; K, 60 Low: N, 30; P, 30; K, 10	6.0 5.4	7.1 4.0	2.2 1.1
LoB2 LoC LoC2 MeB2	Loring silt loam, 2 to 5 percent slopes, eroded. Loring silt loam, 5 to 8 percent slopes. Loring silt loam, 5 to 8 percent slopes, eroded. Memphis silt loam, 2 to 5 percent slopes, eroded.	Millet or sudangrass.	High: N, 120; P, 60; K, 50 Low: N, 30; P, 30; K, 10	6.0 5.4	7.5 3.0	3.0 1.1
	Group 2:					
GrD2	Grenada silt loam, 8 to 12 percent slopes, eroded.	Bahiagrass or common bermudagrass mixed with crimson clover, annual lespedeza, or vetch.	High: N, 100; P, 60; K, 60. Low: N, 20, P, 10; K, 10	6.0 5.4	9.6 5.7	2.9 1.6
LoD	Loring silt loam, 8 to 12 percent slopes.	Oats, wheat, and ryegrass.	High: N, 150; P, 90; K, 60 Low: N, 30; P, 30; K, 10	6.0 5.4	7.1 4.0	2.2 1.1
LoD2 LoE2 RpE2	Loring silt loam, 8 to 12 percent slopes, eroded. Loring silt loam, 12 to 17 percent slopes, eroded. Ruston, Providence, and Eustis soils, 12 to 17 percent slopes, eroded.	Millet or sudangrass.	High: N, 120; P, 60; K, 50 Low: N, 30; P, 30; K, 10	6.0 5.4	7.5 3.0	3.0 1.1
	Group 3:					
GrB3	Grenada silt loam, 2 to 5 percent slopes, severely eroded.	Bahiagrass or common bermudagrass mixed with crimson clover, lespedeza, or vetch.	High: N, 100; P, 60; K, 60 Low: N, 20; P, 10; K, 10	6.0 5.4	8.0 4.7	2.4 1.1
GrC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded.	Oats, wheat, and ryegrass.	High: N, 150; P, 90; K, 60 Low: N, 30; P, 30; K, 10	6.0 5.4	6.4 3.2	2.0 1.0
GrD3 LoB3 LoC3 LoD3 LoE3 MeB3 MeC3	Grenada silt loam, 8 to 12 percent slopes, severely eroded. Loring silt loam, 2 to 4 percent slopes, severely eroded. Loring silt loam, 5 to 8 percent slopes, severely eroded. Loring silt loam, 8 to 12 percent slopes, severely eroded. Loring silt loam, 12 to 17 percent slopes, severely eroded. Memphis silt loam, 2 to 5 percent slopes, severely erdoed. Memphis silt loam, 5 to 8 percent slopes, severely eroded.	Millet or sudangrass.	High: N, 120; P, 60; K, 50 Low: N, 30; P, 30; K, 10	6.0 5.4	6.7 2.4	(2) (2)
	Group 4:					
CaA	Calloway silt loam, 0 to 2 percent slopes.	Dallisgrass mixed with vetch, wild winter peas, or whiteclover.	High: N, 100; P, 60; K, 60 Low: N, 20; P, 20; K, 10	6.0 5.4	8.3 5.1	2.4 1.5
CaB	Calloway silt loam, 2 to 5 percent slopes.	Tall fescue mixed with vetch, wild winter peas, or whiteclover.	High: N, 100; P, 60; K, 60 Low: N, 20; P, 20; K, 10	6.0 4.5	6.7 3.4	2.0 1.2

See footnotes at end of table.

TABLE 3.—*Estimated yields of pasture and hay, by groups of soils, at high and low levels of liming and fertilization*—Continued

Symbol on map	Soil	Plants for pasture or hay	Annual fertilization	pH brought to—	Yields	
					Pasture	Hay (air dried)
			Pounds per acre		*Cow-acre-months* [1]	*Tons*
He	Henry silt loam.	Common bermudagrass or bahiagrass mixed with vetch, wild winter peas, or whiteclover.	High: N, 100; P, 60; K, 60 Low: N, 20; P, 20; K, 10	6.0 5.4	8.0 4.6	2.4 1.3
		Oats, wheat, and ryegrass.	High: N, 150; P, 90; K, 60 Low: N, 30; P, 30; K, 10	6.0 5.4	6.5 3.6	2.0 1.0
	Group 5:					
Cm	Collins silt loam.	Common bermudagrass or bahiagrass mixed with whiteclover, wild winter peas, or vetch.	High: N, 100; P, 60; K, 60 Low: N, 20; P, 10; K, 10	6.0 5.3	11.0 7.3	3.2 2.1
Co	Collins silt loam, local alluvium.	Dallisgrass mixed with whiteclover, wild winter peas, or vetch.	High: N, 100; P, 60; K, 60 Low: N, 20; P, 10; K, 10	6.5 5.5	11.3 7.5	3.3 2.2
Fa	Falaya silt loam.					
Fl	Falaya silt loam, local alluvium.	Oats, wheat, and ryegrass	High: N, 150; P, 90; K, 60 Low: N, 30; P, 30; K, 10	6.5 5.7	7.0 3.2	3.0 1.0
Fs	Falaya silty clay loam.	Tall fescue mixed with whiteclover, wild winter peas, or vetch.	High: N, 150; P, 90; K, 60 Low: N, 30; P, 30; K, 10	6.5 5.7	9.6 4.9	2.9 1.5
Fw	Falaya and Waverly silt loams.					
Mx	Mixed alluvial land.					
	Group 6:					
Wa	Waverly silt loam.	Dallisgrass mixed with whiteclover or wild winter peas.	High: N, 100; P, 60; K, 60 Low: N, 20; P, 10; K, 10	6.1 5.5	10.0 7.5	3.0 2.2
		Fescue mixed with whiteclover or wild winter peas.	High: N, 150; P, 60; K, 60 Low: N, 30, P, 30; K, 10	6.1 5.5	9.3 6.3	2.8 1.8
	Group 7:					
Aa	Alligator clay, 0 to ½ percent slopes.	Tall fescue mixed with whiteclover	High: N, 120; P, 0; K, 0 Low: N, 30; P, 0; K, 0	(3) (3)	12.0 9.9	(2) (2)
Ab	Alligator clay, ½ to 2 percent slopes.	Coastal bermudagrass mixed with wild winter peas.	High: N, 120; P, 0; K, 0 Low: N, 30; P, 0; K, 0	(3) (3)	15.0 11.0	7.0 4.0
Ac	Alligator silt loam, overwash, ½ to 2 percent slopes.	Common bermudagrass mixed with wild winter peas.	High: N, 120; P, 0; K, 0 Low: N, 30; P, 0; K, 0	(3) (3)	10.6 7.5	6.0 3.0
Ad	Alligator silty clay loam, 0 to ½ percent slopes.	Johnsongrass mixed with red clover.	High: N, 120; P, 0; K, 0 Low: N, 30; P, 0; K, 0	(3) (3)	12.0 7.6	7.0 4.5
Ae	Alligator silty clay loam, ½ to 2 percent slopes.					
Do	Dowling silty clay and clay.					

[1] Number of cows, or other animal units, that can graze 1 acre, without injury to the pasture, times the number of months the pasture can be grazed in 1 year.

[2] Soil not used for hay.

[3] Soil does not need lime.

YIELDS OF CROPS

The estimated yields of the crops listed in table 2 are based (1) on long-term experiments; (2) on yields harvested on farms in studies of productivity and management; and (3) on estimates by agronomists and other agricultural workers.

The combined effects of slope, weather, and management were considered in estimating the yields. If data on a soil were not available, the estimates were made from data on similar soils. An estimate is not given in table 2 for a crop not commonly grown on a specified soil or not suited to it. Rainfall was assumed to be the average of a long period. Flooding was not considered, but the past and present effect of floods on yields must be considered locally. The estimates are for nonirrigated soils.

Under the management now commonly practiced in Panola County, yields are 20 to 35 percent less than those shown in table 2. To obtain the yields listed in the table, manage your soils as follows:

1. Fertilize at planting according to the needs indicated by soil tests, by past practices in cropping and fertilizing, and by recommendations of the Mississippi Agricultural Experiment Station.
2. Use crop varieties that are suited to the soil and produce high yields.

3. Prepare adequate seedbeds.
4. Plant or seed by suitable methods, at suitable rates, and at the right time.
5. Inoculate legumes.
6. Use shallow cultivation of row crops.
7. Control weeds, insects, and diseases.
8. Manage water, where needed, by using open ditches, sod waterways, contour cultivation, terraces, or contour stripcropping.
9. Protect the soil from overgrazing.

Although soil tests should be used in determining the rates of fertilization, specified rates of fertilization and of planting were assumed in estimating the yields in table 2. By good management that includes fertilizing and planting at about the rates assumed, which are those suggested in the following paragraphs, you can expect to obtain the yields in table 2. Plant the varieties recommended by the Mississippi Agricultural Experiment Station.

Corn: On hilly soils and on Falaya soils, apply per acre about 40 pounds of phosphoric acid (P_2O_5) and 40 pounds of potash (K_2O); the rates for phosphoric acid and potash will vary according to the kind of soil and past fertilization. Sidedress with 60 to 90 pounds of nitrogen per acre, and apply lime as indicated by soil tests. Space the plants 15 inches apart in rows 42 inches wide or 16 inches apart in rows 40 inches wide.

Cotton: On suitable hilly soils and on Falaya soils, apply per acre at planting time 72 pounds of nitrogen, 48 pounds of phosphoric acid (P_2O_5), and 48 pounds of potash (K_2O). Apply lime as indicated by soil tests. Plant between April 10 and May 10 as weather permits. Hill drop 16 to 22 pounds of delinted seed per acre, or drill 20 to 30 pounds of delinted seed. Increase planting rates 10 to 15 pounds per acre if seed is not delinted.

On suitable soils of the delta, add 100 to 120 pounds of nitrogen per acre, and add lime as indicated by soil tests. Plant after April 1 as soon as weather permits and the soil is warm enough. Hill drop 16 to 22 pounds of delinted seed per acre. Drill 30 to 40 pounds of delinted seed per acre or, if the cotton is to be cross cultivated, drill 60 pounds of delinted seed.

Soybeans: Fertilizer is not needed on soils of the delta. On suitable hilly soils apply per acre at planting time 30 pounds of phosphoric acid (P_2O_5) and 60 pounds of potash (K_2O). Add lime on hilly soils and soils of the delta as indicated by soil tests. Plant between May 1 and June 1, and set 10 to 12 seeds per foot of row. Rows 36 to 40 inches apart require 40 to 50 pounds of seed per acre.

Oats: On suitable hilly soils, apply per acre at planting time 20 pounds of nitrogen, 20 pounds of phosphoric acid (P_2O_5), and 20 pounds of potash (K_2O). Topdress with 60 pounds of nitrogen about March 1. On suitable soils of the delta, apply 60 pounds of nitrogen per acre between February 20 and March 15. On both hilly soils and soils of the delta, add lime as indicated by soil tests. Plant oats between September 15 and October 15 at the rate of 3 bushels per acre.

YIELDS OF PASTURE

The estimated yields of forage crops in table 3 are based on data obtained in long-term experiments and on estimates by agronomists and other agricultural workers who have had much experience with forage crops on the soils in this county. Rainfall is assumed to be the average of a long period. The estimates are for nonirrigated soils.

The soils of Panola County are placed in seven groups in table 3. The soils in each group are suited to the same plants for pasture or hay, require about the same management, and have about the same yields under similar management.

The specified rates for high and low fertilization in table 3 are not recommendations. The rates are those required, on any soil in a group, to obtain the estimated yields listed if, where needed, enough lime is added to the soil to bring it to the pH given for the corresponding level of fertilization.

Yields for pasture in table 3 are listed in cow-acre-months. A cow-acre-month provides enough grazing for one animal unit for one month. Each figure is the product of the number of animal units that can graze 1 acre, without injury to the pasture, times the number of months the pasture can be grazed in one year. An animal unit is one 1,200-pound cow; two 500-pound yearlings; five ewes with lambs; five sows with litters to weaning age; twenty 50- to 150-pound pigs; one horse; or one mule.

The estimates of yields given in table 3 are useful in planning balanced grazing and safe stocking.

Some soils of Panola County are omitted from table 3 because they are not suitable for pasture and hay. The erosion hazard on these soils is severe, and mowing weeds and other management is difficult. These soils are—

- Cuthbert and Providence soils, 12 to 35 percent slopes, eroded.
- Gullied land, sandy.
- Gullied land, silty.
- Memphis and Loring silt loams, 17 to 35 percent slopes, eroded.
- Memphis and Loring silt loams, 17 to 35 percent slopes, severely eroded.
- Memphis, Natchez, and Guin soils, 17 to 40 percent slopes, eroded.
- Ruston, Providence, and Eustis soils, 17 to 35 percent slopes, eroded.

Engineering Applications

Soil engineering is well established today. In a broad sense it is a subdivision of structural engineering, for it deals with soils as the foundation material upon which structures rest or with soils when used as a structural material. To the engineer, soils are natural materials that occur in great variety on the earth's surface. Properties of soils that affect engineering may vary widely from place to place and within the area of a single project. Generally, soils are used at about the same locality and in about the same condition they are found. A large part of soil engineering consists of locating the various soils, of determining their engineering properties, of correlating those properties with the requirements of the job, and of selecting the best possible material for each job.

This soil survey report contains information about the soils of Panola County that will help engineers. This subsection emphasizes properties of soils related to agricultural engineering, especially properties affecting irrigation, farm ponds, and structures that control and conserve soil and water. The information in this report will help the engineer (1) to select and develop industrial, business, residential, and recreational sites, (2) to select locations for highways, pipelines, and airports, (3) to locate sand and gravel for use in construction, (4) to

correlate pavement performance with kinds of soil and thus develop information that will be useful in designing and maintaining the pavement, (5) to determine the suitability of soils for the cross-country movement of vehicles and construction equipment, and (6) to supplement information obtained from other published maps and reports and from aerial photographs for the purpose of making soil maps and reports that can be used readily by engineers.

Engineers of the Mississippi State Highway Department collaborated with soil scientists of the Soil Conservation Service in preparing this report. These specialists combined their knowledge and interpreted the soils on the basis of the information obtained from laboratory tests and field experiences.

The soil maps included in this report and the corresponding interpretations are necessarily generalized and, without further tests and sampling, are not sufficient to be used in locating, designing, and constructing specific engineering works.

At many construction sites, the soil material varies greatly within the depth of proposed excavations and sev-

TABLE 4.—*Brief description of soils*

Symbol on map	Soil name	Depth to seasonally high water table	Description of soil and site	Depth from surface (typical profile)
		Feet		*Inches*
Aa Ab Ad Ae Ac	Alligator clay, 0 to ½ percent slopes. Alligator clay, ½ to 2 percent slopes. Alligator silty clay loam, 0 to ½ percent slopes. Alligator silty clay loam, ½ to 2 percent slopes. Alligator silt loam, overwash, ½ to 2 percent slopes.	0–1	Poorly drained, acid, clayey and silty soils in slack-water areas.	0–5 5–30 30–54+
CaA CaB	Calloway silt loam, 0 to 2 percent slopes. Calloway silt loam, 2 to 5 percent slopes.	[1] 1–2	Somewhat poorly drained, acid, silty soils that are on uplands in loess and are 4 feet or more thick; fragipan is at a depth of about 16 inches.	0–6 6–11 11–16 16–50 50–60+
Cm Co	Collins silt loam (0 to 2 percent slopes). Collins silt loam, local alluvium (0 to 3 percent slopes).	2–4	Moderately well drained, acid, silty soils that are on bottom lands in loessal alluvium and are 4 feet or more thick.	0–6 6–24 24–48+
CpF2	Cuthbert and Providence soils, 12 to 35 percent slopes, eroded.	10–20	Undifferentiated, moderately well drained to poorly drained, acid soils of variable texture that are in thin loess and sandy and clayey material on the Coastal Plain; fragipan is at a depth of about 24 inches in places.	Cuthbert: 0–7 7–27 27–44 44–49+ Providence: 0–5 5–24 24–34 34–47+
Do	Dowling silty clay and clay (0 to 2 percent slopes).	0–1	Poorly drained, acid heavy clay soils in depressions and slack-water areas on the Delta of the Mississippi River.	0–6 6–47+
Fa Fl	Falaya silt loam (0 to 2 percent slopes). Falaya silt loam, local alluvium (0 to 3 percent slopes).	½ 2	Somewhat poorly drained, acid, silty soils that are on bottom lands in loessal alluvium and are 4 feet or more thick.	0–7 7–43+
Fs	Falaya silty clay loam (0 to 2 percent slopes).	½–2	Somewhat poorly drained, acid soils that are on bottom lands in loessal alluvium and are 4 feet or more thick.	0–7 7–13 13–49+
Fw	Falaya and Waverly silt loams (0 to 2 percent slopes).	0–2	Undifferentiated, somewhat poorly drained and poorly drained, acid soils that are on bottom lands in loessal alluvium and are 4 feet or more thick.	Falaya: 0–7 7–43+ Waverly: 0–7 7–14

See footnotes at end of table.

eral different soils occur within short distances. The maps, soil descriptions, and other data in this report can be used in planning detailed soil investigations at the construction site. Then the number of soil samples needed for laboratory testing should be a minimum. After testing the soil materials and observing their behavior in place under varying conditions, the engineer should be able to anticipate, to some extent, the properties of individual soils wherever they are mapped.

Most of the information in this subsection is in tables 4, 5, and 6. Table 4 shows the estimated physical properties of the soils in the county. Table 5 is an interpretation of soils for engineering uses. Table 6 lists actual test data for Calloway silt loam and Waverly silt loam. Information useful to engineers can also be found in the sections "Descriptions of Soils" and "Formation and Classification of Soils."

This report uses agricultural terms to describe soils and their uses in farming and related fields. Many of these terms have a meaning to agricultural workers that differs from the meaning understood by engineers. These terms are defined in the Glossary in their agricultural sense.

and their estimated physical properties

Classification			Percentage passing sieve—		Permeability	Available water capacity	Reaction	Dispersion	Shrink-swell potential
USDA texture	Unified	AASHO	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)					
					Inches per hour	*Inches per inch of soil*	*pH value*		
Clay	CH	A-7	100	90–100	<0.05	0.150	5.0	Low	High.
Clay	CH	A-7	100	90–100	<0.05	.150	5.0	Low	High.
Clay	CH	A 7	100	90–100	<0.05	.150	5.0	Low	High.
Silt loam	ML or CL	A-4	100	90–99	0.8–2.5	.116	6.0	High	Low.
Silt loam	ML or CL	A-4 or A-6	100	90–99	0.8–2.5	.116	6.0	Moderate	High.
Heavy silt loam	CL	A-4 or A-6	100	90–97	0.8–2.5	.100	5.0	Moderate	Moderate.
Silt loam	ML or CL	A-4 or A-6	100	90–97	<0.05	.100	5.0	Moderate	Low to moderate.
Silt loam	ML or CL	A-4	99	90–98	0.8–2.5	.100	5.0	High	Low.
Silt loam	ML or CL	A-4	100	90–100	0.8–2.5	.125	5.5	High	Low.
Silt loam	ML or CL	A-4	100	90–100	0.8–2.5	.116	5.5	High	Low.
Silt loam	ML or CL	A-4	100	90–100	0.8–2.5	.116	5.0	High	Low.
Fine sandy loam	SM	A-2 or A-4	100	30–40	2.5–5.0	.108	5.0	High	Low.
Sandy clay loam and clay loam.	SC or CL	A-6 or A-7	100	45–60	0.8–2.5	.108	5.0	Moderate	Moderate.
Clay	CH	A-7	100	55–75	<0.05	.083	4.5	Low	High.
Sand and clay [2]									
Silt loam	ML or CL	A 4 or A 6	100	70–85	0.8–2.5	.133	5.0	Moderate	Low to moderate.
Light silty clay loam to silt loam.	CL	A-6	100	85–95	0.8–2.5	.133	5.0	Moderate	Moderate.
Silt loam	ML or CL	A-4 or A-6	100	70–90	<0.05	.058	5.0	Moderate	Low to moderate.
Loam	CL	A-4 or A-6	100	50–60	<0.05	.058	5.0	Moderate	Moderate.
Silty clay	CH	A-7	100	90–100	<0.05	.150	5.0	Low	High.
Clay	CH	A 7	100	90–100	<0.05	.150	5.0	Low	High.
Silt loam	ML	A-4	100	90–100	0.8–2.5	.125	5.0	High	Low.
Silt loam	ML	A-4	100	90–100	0.8–2.5	.125	5.0	High	Low.
Silty clay loam	CL	A-6	100	90–100	0.8–2.5	.133	5.0	Low	Moderate.
Heavy silt loam	CL	A-4 or A-6	100	90–100	0.8–2.5	.133	5.0	Moderate	Moderate.
Silt loam	ML or CL	A 4 or A 6	100	90–100	0.8–2.5	.116	5.0	Moderate	Moderate.
Silt loam	ML	A 4	100	90–100	0.8–2.5	.125	5.0	High	Low.
Silt loam	ML	A-4	100	90–100	0.8–2.5	.125	5.0	High	Low.
Silt loam	ML	A-4	100	90–100	0.2–0.8	.116	5.0	High	Low.
Silt loam	ML or CL	A-4 or A-6	100	90–100	0.2–0.8	.116	5.0	Moderate	Low to moderate.

TABLE 4.—*Brief description of soils and*

Symbol on map	Soil name	Depth to seasonally high water table	Description of soil and site	Depth from surface (typical profile)
		Feet		*Inches*
				14–75+
GrA GrB GrB2 GrB3 GrC2 GrC3 GrD2 GrD3	Grenada silt loam, 0 to 2 percent slopes. Grenada silt loam, 2 to 5 percent slopes. Grenada silt loam, 2 to 5 percent slopes, eroded. Grenada silt loam, 2 to 5 percent slopes, severely eroded. Grenada silt loam, 5 to 8 percent slopes, eroded. Grenada silt loam, 5 to 8 percent slopes, severely eroded. Grenada silt loam, 8 to 12 percent slopes, eroded. Grenada silt loam, 8 to 12 percent slopes, severely eroded.	[1] 2–10+	Moderately well drained, acid soils that are on uplands in loess and are 4 feet or more thick; fragipan is at a depth of about 24 inches.	0–5 5–23 23–53+
Gs	Gullied land, sandy.[1]		Very severely eroded or severely gullied soils on material of the Coastal Plain.	
Gu	Gullied land, silty.[1]		Very severely eroded or severely gullied, loessal soils.	
He	Henry silt loam (0 to 2 percent slopes).	[1] 0–1	Poorly drained, acid soils that are on uplands in loess and are 4 feet or more thick; fragipan is at a depth of 10 to 23 inches.	0–6 6–23 23–45+
LoB2 LoB3 LoC LoC2 LoC3 LoD LoD2 LoD3 LoE2 LoE3	Loring silt loam, 2 to 5 percent slopes, eroded. Loring silt loam, 2 to 5 percent slopes, severely eroded. Loring silt loam, 5 to 8 percent slopes. Loring silt loam, 5 to 8 percent slopes, eroded. Loring silt loam, 5 to 8 percent slopes, severely eroded. Loring silt loam, 8 to 12 percent slopes. Loring silt loam, 8 to 12 percent slopes, eroded. Loring silt loam, 8 to 12 percent slopes, severely eroded. Loring silt loam, 12 to 17 percent slopes, eroded. Loring silt loam, 12 to 17 percent slopes, severely eroded.	[1] 5–20	Moderately well drained and well drained, acid soils that are on uplands and are 4 feet or more thick; fragipan generally is at a depth of about 30 inches.	0–5 5–33 33–54+
MeB2 MeB3 MeC3	Memphis silt loam, 2 to 5 percent slopes, eroded. Memphis silt loam, 2 to 5 percent slopes, severely eroded. Memphis silt loam, 5 to 8 percent slopes, severely eroded.	5–20	Well-drained, acid soils that are on uplands in loess and are 4 feet or more thick.	0–4 4–31 31–65+
MIF2 MIF3	Memphis and Loring silt loams, 17 to 35 percent slopes, eroded. Memphis and Loring silt loams, 17 to 35 percent slopes, severely eroded.	10–20	Undifferentiated, moderately well drained and well drained, acid soils that are on uplands in loess and are 4 feet or more thick; in some places a fragipan is at a depth of 30 inches or more.	Memphis: 0–4 4–31 31–65 Loring: 0–5 5–33 33–54+

See footnotes at end of table.

their estimated physical properties—Continued

Classification			Percentage passing sieve—		Permeability	Available water capacity	Reaction	Dispersion	Shrink-swell potential
USDA texture	Unified	AASHO	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)					
					Inches per hour	*Inches per inch of soil*	*pH value*		
Heavy silt loam and silt.	CL	A-6	100	90-100	0.05-0.2	.100	5.0	Moderate	Moderate.
Silt loam	ML	A-4	100	90-100	0.8-2.5	.116	5.0	High	Low.
Heavy silt loam	CL	A-6	100	90-10	0.8-2.5	.150	5.0	Moderate	Moderate.
Silt loam	ML or CL	A-4 or A-6	100	90-100	<0.05	.058	4.5	Moderate	Moderate.
Silt loam	ML or CL	A-4 or A-6	100	90-100	0.8-2.5	.116	5.0	Moderate	Low to moderate.
Silt loam	ML or CL	A-4 or A-6	100	90-100	0.8-2.5	.116	5.0	Moderate	Moderate.
Silt loam	ML or CL	A-4 or A-6	100	90-100	<0.05	.083	5.0	Moderate	Low to moderate.
Silt loam	ML	A-4	100	90-100	0.8-2.5	.116	5.0	High	Low.
Heavy silt loam to light silty clay loam.	CL	A-6	100	90-100	0.8-2.5	.141	5.0	Moderate	Moderate.
Silt loam	ML or CL	A-4 or A-6	100	90-100	<0.05	.150	4.5	High	Low to moderate.
Silt loam	ML	A-4	100	90-100	0.8-2.5	.116	5.0	High	Low.
Heavy silt loam to light silty clay loam.	CL	A-6	100	90-100	0.8-2.5	.141	4.5	Moderate	Moderate.
Silt loam	ML	A-4	100	90-100	0.8-2.5	.150	5.0	High	Low.
Silt loam	ML	A-4	100	90-100	0.8-2.5	.116	5.0	High	Low.
Heavy silt loam to light silty clay loam.	CL	A-6	100	90-100	0.8-2.5	.141	4.5	Moderate	Moderate.
Silt loam	ML	A-4	100	90-100	0.8-2.5	.150	5.0	High	Low.
Silt loam	ML	A-4	100	90-100	0.8-2.5	.116	5.0	High	Low.
Heavy silt loam to light silty clay loam.	CL	A-6	100	90-100	0.8-2.5	.141	5.0	Moderate	Moderate.
Silt loam	ML or CL	A-4 or A-6	100	90-100	<0.05	.150	4.5	High	Low to moderate.

TABLE 4.—*Brief description of soils and*

Symbol on map	Soil name	Depth to seasonally high water table	Description of soil and site	Depth from surface (typical profile)
		Feet		*Inches*
MnF2	Memphis, Natchez, and Guin soils, 17 to 40 percent slopes, eroded.	10-20	Undifferentiated, excessively drained to well-drained, strongly acid to moderately alkaline soils on uplands. The Memphis and Natchez soils formed in a thick layer of loess; Guin soil formed in gravelly material of the Coastal Plain and has many gravel pits.	Memphis: 0-6 6-25 25-49 49-60+ Natchez: 0-6 6-18 18-66+ Guin: 0-5 5-50+
Mx	Mixed alluvial land (0 to 3 percent slopes).[2]	1-3	Somewhat poorly drained to excessively drained, acid soils of variable texture that are on bottom lands in loessal and sandy material of the Coastal Plain.	
RpE2 RpF2	Ruston, Providence, and Eustis soils, 12 to 17 percent slopes, eroded. Ruston, Providence, and Eustis soils, 17 to 35 percent slopes, eroded.	10-20	Undifferentiated, excessively drained to moderately well drained, acid soils that are on uplands in thin loess and sandy material of the Coastal Plain; in some places a fragipan is at a depth of about 24 inches.	Ruston: 0-11 11-34 34-51+ Providence: 0-2 2-22 22-32 32-52 52-61+ Eustis: 0-5 5-45 45-55+
Wa	Waverly silt loam (0 to 2 percent slopes).	0-1	Poorly drained, acid soils that are on bottom lands in loessal alluvium and are 4 feet or more thick.	0-7 7-14 14-75+

[1] Perched water table.
[2] Soil material too variable for physical properties to be estimated.

their estimated physical properties—Continued

Classification			Percentage passing sieve—		Permeability	Available water capacity	Reaction	Dispersion	Shrink-swell potential
USDA texture	Unified	AASHO	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)					
					Inches per hour	*Inches per inch of soil*	*pH value*		
Silt loam	ML	A-4	100	90–100	0. 8–2. 5	. 116	5. 0	High	Low.
Light silty clay loam to heavy silt loam.	CL	A-6	100	90–100	0. 8–2. 5	. 116	5. 0	Moderate	Moderate.
Silt loam	ML	A-4	100	90–100	0. 8–2. 5	. 150	5. 5	High	Low.
Silt loam	ML	A-4	100	90–100	0. 8–2. 5	. 150	6. 5	High	Low.
Silt loam	ML	A-4 or A-6	100	90–100	0. 8–2. 5	. 116	7. 5	High	Low to moderate.
Silt loam	ML	A-4 or A-6	100	90–100	0. 8–2. 5	. 116	6. 0	High	Low to moderate.
Silt loam	ML	A-4 or A-6	100	90–100	0. 8–2. 5	. 150	8. 0	High	Low to moderate.
Gravelly silt loam	GM or SM	A-1 or A-2	35–45	15–25	2. 5–5. 0	. 058	6. 0	High	Low.
Gravelly sandy loam	GM or SM	A-1 or A-2	20–60	10–30	>10. 0	. 058	6. 0	High	Low.
Fine sandy loam	SM	A-2	100	30–40	2. 5–5. 0	. 066	5. 0	High	Low.
Sandy clay loam	SC	A-6	100	45–55	0. 8–2. 5	. 066	5. 0	Moderate	Moderate.
Loamy sand	SM	A-2	100	15–30	>10. 0	. 066	5. 0	Moderate	Low.
Silt loam	ML or CL	A-4 or A-6	100	70–85	0. 8–2. 5	. 133	5. 0	Moderate	Low to moderate.
Light silty clay loam	CL	A-6	100	85–95	0. 8–2. 5	. 133	4. 5	Low	Moderate.
Silt loam	ML or CL	A-4 or A-6	100	70–90	<0. 05	. 058	5. 0	Moderate	Low to moderate.
Loam	CL	A-6	100	50–60	<0. 05	. 058	5. 0	Moderate	Moderate.
Fine sandy loam	SM	A-4	100	40–50	<0. 05	. 058	5. 0	High	Low.
Sandy loam	SM	A-4 or A-2	100	25–40	2. 5–5. 0	. 058	5. 0	High	Low.
Loamy sand	SM	A-2	100	15–30	>10. 0	. 066	5. 0	High	Low.
Sandy clay loam	SC	A-6	100	45–55	0. 8–2. 5	. 141	4. 5	Moderate	Moderate.
Silt loam	ML	A-4	100	90–100	0. 2–0. 8	. 116	5. 0	High	Low.
Silt loam	ML or CL	A-4 or A-6	100	90–100	0. 2–0. 8	. 116	5. 0	Moderate	Low to moderate.
Heavy silt loam and silt loam.	CL	A-6	100	90–100	0. 5–0. 2	. 100	5. 0	Moderate	Moderate.

TABLE 5.—*Interpretation of*

Soil series and map symbols	Suitability for winter grading	Suitability as a source of—			Suitability for	
		Road subgrade	Road fill	Topsoil	Dikes or levees	Farm ponds
						Reservoir area
Alligator (Aa, Ab, Ac, Ad, Ae).	Poor; heavy clay material.	Poor	Poor	Poor	Poor	Good
Calloway (CaA, CaB)	Poor; high water table caused by fragipan.	Fair to poor	Poor; unstable	Unsuitable	Poor; material unstable but can be used if moisture is controlled.	Good; no seepage.
Collins (Cm, Co)	Fair to poor; high water table.	Fair to poor	Poor; unstable and needs close control of moisture.	Fair to good	Poor; material unstable but can be used if properly controlled.	Good; little seepage.
Cuthbert and Providence (CpF2).	Poor; high erodibility.	Fair	Fair	Poor	Poor	Good
Dowling (Do)	Poor; heavy clay material.	Poor	Poor	Poor	Poor	Good
Falaya (Fa, Fl, Fs)	Poor; high water table.	Fair to poor	Poor; unstable but can be used if properly controlled.	Fair	Poor; material unstable but can be used if properly controlled.	Good; little seepage.
Falaya and Waverly (Fw).	Poor; high water table.	Fair to poor	Fair to poor	Poor	Poor; material unstable but can be used if properly controlled.	Good; little seepage.
Grenada (GrA, GrB, GrB2, GrB3, GrC2, GrC3, GrD2, GrD3).	Poor; high water table caused by fragipan.	Fair to poor	Poor; unstable	Poor	Poor; material unstable but can be used if properly controlled.	Good; no seepage.
Henry (He)	Poor; high water table caused by fragipan.	Fair to poor	Poor; unstable	Poor	Poor; material unstable but can be used if properly controlled.	Good; no seepage.
Loring (LoB2, LoB3, LoC, LoC2, LoC3, LoD, LoD2, LoD3, LoE2, LoE3.)	Poor; high erodibility.	Fair to poor	Fair to poor; unstable and easily eroded.	Poor	Poor; material unstable but can be used if properly controlled.	Good; some loss of water through absorption.
Memphis (MeB2, MeB3, MeC3).	Poor; high erodibility.	Fair to poor	Fair to poor; unstable and easily eroded.	Poor	Poor; material unstable but can be used if properly controlled.	Good; some loss of water through absorption.
Memphis and Loring (MlF2, MlF3).	Poor; high erodibility.	Fair to poor	Fair to poor; unstable and easily eroded.	Poor	Poor; material unstable but can be used if properly controlled.	Good; some loss of water through absorption.
Memphis, Natchez, and Guin (MnF2).	Poor for Memphis and Natchez; good for Guin.	Fair to poor for Memphis and Natchez; good for Guin.	Fair to poor for Memphis and Natchez; good for Guin.	Poor to fair for Memphis and Natchez; fair to good for Guin.	Poor; material unstable but can be used if properly controlled.	Good; some loss of water through absorption in Memphis and Natchez; poor for Guin because of seepage.
Ruston, Providence, and Eustis (RpE2, RpF2).	Fair to good	Good to poor.	Good to poor	Poor	Fair	Poor

See footnotes at end of table.

soils for engineering uses

Suitability for—Continued		Features affecting—			
Farm ponds—Con.: Embankment	Irrigation	Vertical alinement of highways	Agricultural drainage	Terraces and diversions	Waterways
Good; material stable	Poor; shallow soil	Very plastic clay; high water table; flooding.	Poor drainage; surface and internal drainage needed.	No need for terraces but may need diversions.	Slight erodibility.
Poor; material unstable and needs close control of moisture.	Fair; thin subsoil above fragipan.	Perched water table; seepage.	Somewhat poor drainage.	High erodibility	High erodibility.
Poor; material unstable but can be used if properly controlled.	Good; will crust and pack.	High water table; flooding.	Poor surface drainage; will slough and cave in.	High erodibility	Slight erodibility.
Fair; material fairly stable.	(1)	Fragipan at 24 inches in places.	No drainage needed	No need for terraces or diversions; moderate to high erodibility.	Moderate to high erodibility.
Good; material stable.	Poor; shallow soil	Very plastic clay; high water table; flooding.	Poor drainage; surface and internal drainage needed.	No need for terraces but may need diversions.	Slight erodibility.
Poor; material unstable but can be used if properly controlled.	Fair; will crust and pack.	High water table; flooding.	Poor surface drainage; will slough and cave in.	High erodibility	Slight erodibility.
Poor; material unstable.	Fair to poor	High water table; flooding.	Poor surface and internal drainage.	No need for terraces but may need diversions; high erodibility.	Moderate erodibility.
Poor to good; mixed stability, but material can be used if properly controlled.	Good; will crust and pack.	Perched water table; seepage.	Fair surface drainage; drainage on mild slopes needed.	High erodibility	High erodibility.
Poor; material unstable but can be used.	Poor; fragipan near the surface.	Perched water table; seepage.	Poor drainage; surface drainage needed.	No need for terraces but may need diversions.	Slight erodibility.
Poor; material unstable but can be used if properly controlled.	Good; will crust and pack.	Perched water table; seepage; erodibility.	Surface drainage needed on mild slopes.	Needs terraces and diversions; high erodibility.	High erodibility.
Poor; material unstable but can be used if properly controlled.	Good; will crust and pack.	Erodibility	Surface drainage needed on mild slopes.	Needs terraces and diversions; high erodibility.	High erodibility.
Poor; material unstable but can be used if properly controlled.	(1)	Erodibility	No drainage needed.	High erodibility	High erodibility.
Poor; material unstable but can be used if properly controlled; Guin are too gravelly.	(1)	Erodibility	No drainage needed	High erodibility	High erodibility.
Poor; material unstable.	(1)	Erodibility	No drainage needed	No need for terraces or diversions; moderate to high erodibility.	Moderate to high erodibility.

TABLE 5.—*Interpretation of*

Soil series and map symbols	Suitability for winter grading	Suitability as a source of—			Suitability for—	
		Road subgrade	Road fill	Topsoil	Dikes or levees	Farm ponds: Reservoir area
Waverly (Wa)	Poor; high water table.	Fair to poor.	Fair to poor	Poor	Poor; material unstable but can be used if properly controlled.	Good; little seepage.

[1] Interpretations were not made for these soils.
[2] Waterways are not a problem on this soil.

TABLE 6.—*Engineering test data* [1] *for*

[Dashed lines indicate

Soil name and location	Parent material	Report No.	Depth	Horizon	Moisture-density [2]: Maximum density	Moisture-density [2]: Optimum moisture	Shrinkage factors: Limit	Shrinkage factors: Ratio	Shrinkage factors: Volumetric change
			Inches		*Lb. per cu. ft.*	*Percent*			*Percent*
Calloway silt loam:									
1,320 feet W. and 87 feet S. of NE corner, SE¼, T. 8 S., R. 6 W. (Ortho.)	Loess.	S35028	0–6	A_p	95	18	----	----	----
		S35029	16–29	B_{3ml}	99	19	----	----	----
		S35030	50–60	C	105	17	----	----	----
614 feet S. and 1,102 feet W. of NE corner of sec. 34, T. 8 S., R. 7 W.	Loess.	S35031	0–7	A_p	93	20	----	----	----
		S35032	20–30	B_{3mlg}	102	17	----	----	----
		S35033	47–57	C_2	102	18	----	----	----
400 feet S. and 1,140 feet E. of NW corner, NW¼SW¼ sec. 8, T. 10 S., R. 7 W. (No B_1 horizon.)	Loess.	375684	0–6	A_p	96	20	31	1.30	11
		375685	6–10	B_2	106	17	20	1.59	20
		375686	10–17	B_{3mlg}	106	18	21	1.58	21
		375687	60–85	C	109	17	21	1.61	12
Waverly silt loam:									
460 feet S. and 300 feet W. of NE¼NE¼ sec. 33, T. 27 N., R. 3 E. (Ortho.)	Loess.	375680	14–27	C_{2g}	94	23	23	1.53	33
		375681	57–75+	C_{5g}	109	15	20	1.61	6
110 feet S. and 600 feet W. of NE corner, NE¼NE¼ sec. 6, T. 9 S., R. 8 W. (Silty clay at 46 inches.)	Loess.	375682	15–33	C_{2g}	102	21	17	1.65	33
		375683	46–62+	C_{4g}	101	21	16	1.70	50

[1] Tests were performed by the Mississippi State Highway Department under a cooperative agreement with the U.S. Department of Commerce, Bureau of Public Roads, in accordance with standard test procedures of the American Association of State Highway Officials (AASHO). Samples that have the report number prefixed by "S" were tested by the Bureau of Public Roads.
[2] Based on the Moisture-Density Relations of Soils, Using 5.5-pound Rammer and 12-inch Drop, AASHO Designation T99–57, Method A.
[3] Mechanical analyses according to the American Association of State Highway Officials Designation T 88. Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are cal-

soils for engineering uses—Continued

Suitability for—Continued		Features affecting—			
Farm ponds—Con. Embankment	Irrigation	Vertical alinement of highways	Agricultural drainage	Terraces and diversions	Waterways
Poor; material unstable.	Poor; infiltration and permeability are slow.	High water table; flooding.	Poor drainage; surface and internal drainage needed.	No need for terraces but may need diversions.	(2).

soil samples taken from five soil profiles

absence of data]

Mechanical analysis[3]							Liquid limit	Plasticity index	Classification	
Percentage passing sieve—			Percentage smaller than—							
No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO[4]	Unified[5]
100	99	97	95	57	16	11	29	5	A-4(8)	ML-CL.
100	98	96	94	62	25	21	37	13	A-6(9)	ML-CL.
----------	----------	100	97	63	22	17	33	11	A-6(8)	ML-CL.
100	99	98	96	54	10	7	29	3	A-4(8)	ML.
100	98	96	95	61	22	17	32	8	A-4(8)	ML-CL.
----------	----------	99	98	65	26	20	38	14	A-6(10)	ML-CL.
----------	----------	100	90	----------	16	----------	39	7	A-4(8)	ML.
----------	----------	97	89	----------	25	----------	33	10	A-4(8)	ML-CL.
----------	----------	97	93	----------	27	----------	34	11	A-6(8)	ML-CL.
----------	----------	98	89	----------	18	----------	29	6	A-4(8)	ML-CL.
----------	----------	96	91	----------	49	----------	46	18	A-7-6(12)	ML-CL.
100	97	84	76	----------	16	----------	24	2	A-4(8)	ML.
----------	----------	99	98	----------	51	----------	37	18	A-6(11)	CL.
----------	----------	98	95	----------	45	----------	45	26	A-7-6(15)	CL.

culated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soils.

[4] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (Pt. 1, Ed. 7): The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, AASHO Designation M 145-49.

[5] Based on the United Soil Classification System, Tech. Memo. No. 3-357, v. 1, Waterways Experiment Station, Corps of Engineers, March 1953.

Engineering classification of soils

Most highway engineers classify soil materials according to the system approved by the American Association of State Highway Officials (*1*).[2] In this system soil materials are classified in seven principal groups. The groups range from A-1, consisting of gravelly soils of high bearing capacity, to A-7, consisting of clay soils having low strength when wet. Within each group the relative engineering value of the soil material is indicated by a group index number. These numbers range from 0 for the best materials to 20 for the poorest. The group index number is shown in parentheses following the soil group symbol in table 6.

Some engineers prefer to use the Unified soil classification system (*9*). In this system soil material is identified as coarse grained (eight classes), fine grained (six classes), or highly organic. The classification of the soils tested in the laboratory according to the Unified system is given in table 6.

Properties and engineering interpretations of soils

Table 4, page 28, gives a brief description of the soils in the county and estimates of the physical properties that apply to engineering. The estimated physical properties are those of the average soil profile, which is divided in layers that are significant to engineering. The average values of the data on those soils listed in table 6, which is a table of actual test data, are shown in table 4. For soils that were not tested, the estimates in table 4, were based on tests on similar soils and on past experience in engineering construction. Since the estimates are for only the average soils, considerable variation from these values should be anticipated. Generally, the soils are described to a depth of not more than 6 feet.

The water table of most soils generally rises in winter to a point near the surface. The depth from the surface is that of the soil profile typical of the series, which is described in the section "Formation and Classification of Soils." In some parts of Panola County, the upper layers are thinner than those described because much of the soil material has been lost through erosion. The soil material in the main horizons is classified according to textural terms used by the United States Department of Agriculture, and according to the AASHO and Unified systems. Also listed for the horizons are the estimated percentages of material that will pass a No. 10 and a No. 200 sieve.

The permeability of the soil is the rate that water moves through soil material that has not been disturbed. It depends largely upon the soil texture and structure.

The available water, in inches per inch of soil depth, is the approximate amount of capillary water in the soil when it is wet to field capacity. This amount of water will wet air-dry soil material to a depth of 1 inch without deeper percolation. According to table 4, 0.116 inch of water will wet 1 inch of air-dry material in the surface layer of Henry silt loam to field capacity, and the water will not penetrate deeper in the soil.

Reaction is listed in pH values, which indicate the degree of acidity or alkalinity. A pH value of less than 7.0 indicates acidity, and one of more than 7.0 indicates alkalinity.

Dispersion is an estimate of the degree and rapidity that a soil crumbles into individual particles and thereby loses stability. The shrink swell potential indicates how much a soil changes in volume when its moisture content changes. It is estimated primarily on the basis of the amount and type of clay present. In general, soils classified as CH and A–7 have a high shrink-swell potential. Soils that have a low shrink-swell potential are generally nonplastic or slightly plastic. These soils are generally clean sands and gravels (single-grain structure) and soils having small amounts of nonplastic to slightly plastic fines.

Table 5, page 34, gives estimates of the suitability of the soils for winter grading, as sources of material for highway construction, in the construction of farm ponds, and in irrigation work. It also lists features that affect the vertical alinement of highways, agricultural drainage, terraces and diversions, and waterways. The estimates are based on the descriptions of the soils and their properties given in table 4, on the test data in table 6, and on field experience. Some of the data in table 5 are based on experience with the same kind of soils in other counties. Because they are variable, the land types in the county are not listed in table 5.

The suitability of soils for winter grading depends largely on the texture of the soil material, the natural water content, and the depth to the water table in winter. The ratings listed for suitability for winter grading also apply to grading in wet weather. Clay soils are difficult to handle when they are wet. Before they are compacted, they must be dried to an appropriate moisture content. The clay soils in Panola County are poorly suited to winter grading.

The suitability of the soil material for road subgrade and road fill depends largely on the texture and the natural water content of the soil material. Highly plastic soil material is poor for road subgrade and poor or fair for road fill. The rating depends on the natural water content and the ease or difficulty of handling, drying, and compacting the soil material.

Except for some parts of the Memphis, Natchez, and Guin soils and of the Ruston, Providence, and Eustis soils, the soils in this county are not suitable as sources of sand and gravel. Except in isolated areas, ponds or reservoirs for storing water are fairly easy to construct because seepage is not a problem.

Considered in the evaluation of features affecting vertical alinement of highways were clay layers that cause slippage or features that make it difficult to reduce grades. Because of unsuitable drainage, the removal or special treatment of some soils may be needed to provide a stable base for fills. Also, drains may be needed to remove excess surface or subsurface water.

The construction or maintenance of irrigation structures may be impaired (1) by obstacles to excavating or to the use of canals, (2) by the water-holding capacity, (3) by the rate the surface takes in water, (4) by difficulty in leveling shallow soils, or (5) by other hazards.

Soil test data

To help evaluate the soils for engineering purposes, soil samples of two soil series were tested according to standard procedures (*1, 9*). The test data are given in table 6. All samples were obtained at a depth of less than 6 feet.

[2] Italic numbers in parentheses refer to Literature Cited, page 60.

The engineering soil classifications in table 6 are based on data obtained by mechanical analyses and by tests made to determine liquid limits and plastic limits. Mechanical analyses were made by combined sieve and hydrometer methods. In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material in the soil sample, including that coarser than 2 millimeters in diameter. The Soil Conservation Service uses the pipette method and excludes from the calculations material coarser than 2 millimeters in diameter. The percentage of clay obtained by the hydrometer method should not be used in naming soil textural classes.

The relationship between moisture and density is important in earthwork. If a constant effort is used to compact soil material at successively higher contents of moisture, the density of the compacted material will increase until the optimum moisture content is reached. After that, the density decreases with increase in moisture content. The highest density obtained in the compaction test is termed maximum density. Generally, a soil is most stable when compacted to about its maximum density at approximately the optimum moisture content.

The test to determine liquid limit and plastic limit measures the effect of water on the consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a solid to a semisolid, or a plastic state. As the moisture content is further increased, the material changes from the plastic to a liquid state. The plastic limit is the moisture content at which the soil material passes from a solid to a plastic state. The liquid limit is the moisture content at which the material passes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

Soil engineering problems

In this report most information pertaining to soil engineering problems is general. For this reason, engineers of the Soil Conservation Service and other specialists should be consulted before structures are designed or built.

Because some soil layers impede drainage and others are very permeable, the permeability of each soil layer should be considered in planning a drainage system on a farm. Permeability of the soil layers should also be considered if the soil is to be used for a foundation. Texture and structure largely determine permeability, but other soil characteristics may be important. Before designing an irrigation system, it is advisable to evaluate structure, consistence, organic-matter content, and other soil characteristics that affect water-holding capacity. The main problems in highway construction are caused by the physical characteristics of a soil material and by drainage. Bedrock is at such great depth that it presents no problem in this county.

In wet periods the suitability of a soil for earthwork depends on how well the soil is drained and on how easy it is to work when it is wet. From December through April in Panola County, rainfall is well distributed and averages about 5 inches per month. Earthwork may be delayed in this period unless the soil is dried artificially. In winter and early in spring, most soils in Panola County have a high water table that may prevent earthwork. The Ruston and Eustis soils are the only soils in the county that are well suited to earthwork from December through April. These soils are permeable, and they dry out rapidly after rains. Also, their water table is below the normal depth of excavation. The sandy parts of the Providence and Guin soils are suitable for earthwork in winter, but the silty and clayey parts of these soils are not. A high water table restricts earthwork in the Henry, Waverly, Collins, and Falaya soils.

The Henry, Alligator, Dowling, and other soils in the county are ponded or have a high water table for long periods each year. Roads on these soils should be constructed on embankment sections or should have adequate underdrains and surface drains. The embankment should be continuous on the Waverly, Falaya, Collins, and other soils on bottom lands that are likely to be flooded. Also, the grade of the road should be several feet above the level that floodwater reaches frequently.

Because a fragipan is close to the surface in the Calloway, Henry, Providence, and Grenada soils, water accumulates above the fragipan and forms a perched water table. In level areas these soils should have side ditches below the fragipan and a permanent grade at least 4 feet above the fragipan. In steeper areas the fragipan is not a problem, for road cuts normally extend below the pan. Adequate underdrainage, however, must be provided at the point where construction changes from cut to fill. This drainage can be provided by excavating the fragipan and replacing it with more permeable material.

Because loessal materials are susceptible to water erosion, gutters and ditches in loess along roads should be sodded, paved, or provided with check dams. The back slopes of road cuts in loessal material are likely to slump unless they are benched. Deep road cuts in loess should have their back slopes benched at vertical intervals of 10 or 20 feet, and a paved gutter should be built near the edge of each bench. Unless benched, back slopes that are less sloping than vertical are more likely to slump than vertical back slopes.

The back slopes of road cuts made in undisturbed loess can be less steep than the slopes of road fills because loess in place is more stable than disturbed loess. To protect them from erosion, high fills in loess should be benched.

Wet, clayey Alligator and Dowling soils shrink greatly when they dry, and they swell when they get wet again. If subgrade made of these soils is too wet when the pavement is laid, the soil under the edge of the pavement will shrink and cause the pavement to crack lengthwise. If the subgrade is too dry, it will absorb moisture and swell when it is wet and cause the pavement to warp. This cracking and warping of pavements can be lessened by laying on the plastic soils, as a foundation course for the pavement, a thick layer of soil material that has a low volume change. The foundation course should extend through the road shoulder to provide adequate drainage. Wide shoulders and fill slopes that are less steep than normal also help to prevent excessive volume change of the material beneath the pavement.

The shrinking and swelling of suitable subgrade material can be controlled by compacting the material to maximum density, at or slightly above optimum moisture content.

Repeated movements of heavy trucks on the clayey Alligator and Dowling soils cause them to pump, or to forcefully eject, soil material and water from the subgrade through the joints and at the edge of the pavement. Rigid pavement on these soils should not be laid on a subgrade made of soil material so fine textured that more than 35 percent passes a number 200 sieve. Pumping may also occur on other soils, particularly loessal soils that have an undrained fragipan slightly below the pavement. Such soils should be covered with a base course of porous sand and gravel to prevent the pumping action.

The gravelly layers in the Guin soils can provide material suitable for surfacing roads and for use in the subbase and base courses of pavements. These layers, however, may not be suitable for use in concrete structures or in surface courses, because they contain chert and other harmful materials.

Woodland

Forest products have provided much of the income in Panola County since the county was established in 1836. The original forest in the area was hardwood. Because the rivers provided access and the soils along them could be farmed, the early settlers first cleared the level areas along the rivers in the loessal uplands. After a railroad was built in the late 1850's, many more settlers entered the county. For their farms these settlers cleared steep and very steep areas that were naturally fertile.

By 1900 the fields in these steep and very steep areas were so severely eroded that they were not suited to crops and were, therefore, seeded to pasture. Then the bottom lands were cleared for crops. About 90 percent of the uplands in Panola County has been cleared for crops at one time or another. But most of the upland areas have been misused, and now it is more economical to produce pines than hardwoods or crops. About 25 percent of the county is gullied.

Forest types

Stands of trees that cover a considerable part of the county may be classed as forest types according to the kinds and proportions of trees in the stands. A forest type generally is given the name of the tree or trees that are dominant in the stands.

In 1957, according to the U.S. Forest Service, commercial forest covered 135,300 acres, or 31 percent of the county. The following lists the forest types on this woodland and the number of acres occupied by each type.

Forest type:	*Acres*
Oak-hickory	108, 240
Oak-gum-cypress	27, 060

Stands of the oak-hickory forest type are generally in soil associations 3, 5, and 6. (See general soil map.) Stands of the oak-gum cypress type are generally in soil associations 1, 2, and 4.

The oak-hickory forest type (*6*) has 50 percent or more of its stand in upland oak or hickory, alone or mixed. Other trees commonly present are yellow-poplar, elm, maple, and black walnut. The trees in this forest type grow mainly on soils in loessal areas that have small outcrops of Coastal Plain material. These areas extend from north to south in the eastern part of the county.

The oak-gum-cypress forest type is in alluvial areas. At least 50 percent of the stand is tupelo, blackgum, sweetgum, oak, or southern cypress, alone or mixed. Trees common in this type are cottonwood, willow, ash, elm, hackberry, and maple. In this county, the oak-gum-cypress type occurs on the alluvial plains of the Mississippi, Tallahatchie, and Yocona Rivers. It is also in narrow bands along small streams.

Yields from woodland and data on stands

Table 7 lists the amounts of growing stock and sawtimber in the county in 1957. *Sawtimber* consists of live commercial softwoods or hardwoods of a minimum size and culls in which at least 50 percent of the gross sawlog volume is in merchantable logs. The commercial softwoods must be at least 9 inches in diameter at breast height (d.b.h.), and the hardwoods must be at least 11 inches. Each must contain a merchantable butt log 12 feet long. *Growing stock* is the net volume of live sawtimber and live poletimber in cubic feet. This volume is measured from the stump to a point where the diameter inside the bark is at least 4 inches. Poletimber consists of trees smaller than sawtimber that are at least 5 inches in diameter at breast height.

TABLE 7.—*Volume of growing stock and of sawtimber in 1957*

Trees	Growing stock	Sawtimber
	Million cu. ft.	*Million bd. ft.*
Pines	----	----
Cypress, cedar, and other softwoods	0. 7	1. 0
Cottonwood, sweetgum, yellow-poplar, and other soft hardwoods	14. 0	31. 9
Oaks	11. 5	36. 4
Ash, hickory, and other hardwoods	7. 5	20. 2
Total, all species	33. 7	89. 5

Table 8 shows the growth of and yields from shortleaf pine and loblolly pine in unmanaged stands.

TABLE 8.—*Stand and yield information for fully stocked, unmanaged, second-growth stands of shortleaf pine and loblolly pine*

[Yield figures are cumulative. They include all volumes harvested in prior thinnings. Absence of figure indicates that trees of the specified size are not generally processed. Statistics are compiled from United States Department of Agriculture Miscellaneous Publication No. 50 (*3*)]

SHORTLEAF PINE

Site index	Age	Total merchantable volume per acre		
		Rough wood 4-inch d.b.h.[1] and over	9-inch d.b.h.[1] and over	Average d.b.h.[1] of dominan stand
	Years	*Cords*	*Board feet (Doyle rule)*	*Inches*
40	20	----	----	2. 8
	30	13	----	4. 1
	40	24	----	5. 2
	50	30	----	6. 2
	60	34	950	7. 0
	70	37	1, 600	7. 7
	80	38	2, 600	8. 3

See footnote at end of table.

TABLE 8.—*Stand and yield information for fully stocked unmanaged, second-growth stands of shortleaf pine and loblolly pine*—Continued

SHORTLEAF PINE—Continued

Site index	Age	Total merchantable volume per acre: Rough wood 4 inch-d.b.h.[1] and over	Total merchantable volume per acre: 9-inch d.b.h.[1] and over	Average d.b.h.[1] of dominant stand
	Years	*Cords*	*Board feet (Doyle rule)*	*Inches*
50	20			3.2
	30	23		4.8
	40	33		6.1
	50	43	1,600	7.3
	60	48	3,200	8.3
	70	51	5,050	9.1
	80	53	7,000	9.9
60	20	12		3.8
	30	32		5.7
	40	46	1,550	7.3
	50	54	4,350	8.4
	60	60	7,600	9.7
	70	65	10,250	10.6
	80	68	12,700	11.4
70	20	18		4.5
	30	41	750	6.6
	40	56	4,000	8.4
	50	66	8,650	9.5
	60	73	12,600	11.0
	70	79	16,250	12.0
	80	83	19,400	12.8
80	20	25		5.2
	30	48	1,950	7.5
	40	65	7,650	9.8
	50	77	13,550	11.1
	60	85	18,850	12.3
	70	92	23,450	13.3
	80	97	27,550	14.2
90	20	30		6.1
	30	54	4,550	8.8
	40	73	12,600	10.9
	50	87	20,450	12.6
	60	98	27,400	14.0
	70	105	32,850	15.2
	80	112	37,400	16.2
100	20	33	1,050	7.3
	30	60	9,050	10.4
	40	82	19,400	12.8
	50	99	29,500	14.7
	60	111	37,250	16.2
	70	121	42,950	17.5
	80	128	47,200	18.6

LOBLOLLY PINE

Site index	Age	Total merchantable volume per acre: Rough wood 4-inch d.b.h.[1] and over	Total merchantable volume per acre: 9-inch d.b.h.[1] and over	Average d.b.h.[1] of dominant stand
	Years	*Cords*	*Board feet (Doyle rule)*	*Inches*
60	20	12	0	4.6
	30	25	0	6.6
	40	35	1,000	8.1
	50	41	3,000	9.4
	60	46	5,000	10.4
	70	49	7,000	11.2
	80	51	8,500	11.9
70	20	17		5.4
	30	31	1,000	7.8
	40	42	3,500	9.6
	50	50	6,500	10.9
	60	55	10,000	12.1
	70	59	12,500	13.0
	80	62	15,000	13.8
80	20	22		6.2
	30	38	2,000	8.7
	40	51	6,000	10.7
	50	60	11,500	12.2
	60	66	16,000	13.6
	70	70	19,500	14.6
	80	73	22,000	15.5
90	20	27		6.9
	30	46	4,000	9.6
	40	61	10,000	11.7
	50	71	16,500	13.6
	60	78	22,000	15.0
	70	82	26,000	16.2
	80	85	29,000	17.2
100	20	32	500	7.4
	30	53	6,000	10.4
	40	71	14,500	12.8
	50	84	23,000	14.7
	60	92	29,500	16.2
	70	96	33,000	17.6
	80	100	35,500	18.6
110	20	37	1,000	7.9
	30	62	9,000	11.2
	40	82	20,000	13.7
	50	96	29,500	15.7
	60	106	36,500	17.4
	70	112	40,500	18.8
	80	116	43,500	20.0
120	20	42	2,000	8.5
	30	70	12,000	11.9
	40	93	26,000	14.6
	50	110	36,000	16.8
	60	121	43,500	18.6
	70	128	48,000	20.0
	80	134	51,000	21.2

[1] Diameter at breast height.

Woodland suitability groups of soils

Management of woodland can be planned effectively if soils are grouped according to those characteristics that affect the growth of trees and management of the stands. For this reason the soils of Panola County have been placed in ten woodland suitability groups. Each group consists of soils that have about the same suitability for wood crops, require about the same management, and have about the same potential productivity.

Listed in table 9, and later described in the text, are the ten woodland suitability groups in the county. The potential productivity of selected trees is expressed as a site index. Except for cottonwood, the site index is the average height of the dominant and codominant trees in a

TABLE 9.—*Woodland*

[Blank spaces indicate that not enough data are available for estimating site index, or that the trees do

Woodland suitability groups and soils	Potential soil productivity [1]		Suitable trees
	Tree	Site index	
Group 1: Fine-textured, very slowly permeable soils on the Mississippi River alluvial plain— Alligator clay (Aa, Ab). Alligator silt loam, overwash (Ac). Alligator silty clay loam (Ad, Ae).	Willow oak Cheerybark oak Cottonwood Sweetgum	85 to 94 85 to 94 90 to 99 85 to 94	Cottonwood, sweetgum, cherrybark oak, water oak, willow oak, Nuttall oak, overcup oak, green ash, red maple, pecan, and common persimmon.
Group 2: Very slowly permeable soils in depressions of the Mississippi River alluvial plain— Dowling silty clay and clay (Do).			Green ash, baldcypress, water tupelo, and black willow.
Group 3: Fine-textured to coarse-textured soils in loessal and Coastal Plain material— Cuthbert and Providence soils (CpF2). Ruston, Providence, and Eustis soils (RpE2, RpF2).	Loblolly pine Shortleaf pine	79 68	Loblolly pine and shortleaf pine; hardwoods on low slopes and along drains.
Group 4: Eroded and gullied land— Gullied land, sandy (Gs). Gullied land, silty (Gu).			Loblolly pine.
Group 5: Somewhat poorly drained and poorly drained soils in local alluvium that washed from loess-covered uplands— Falaya silt loam (Fa). Falaya silt loam, local alluvium (Fl). Falaya silty clay loam (Fs). Falaya and Waverly silt loams (Fw).	Cherrybark oak Cottonwood Sweetgum	95 to 104 95 to 104 95 to 104	Cottonwood, sweetgum, white ash, green ash, red maple, cherrybark oak, swamp chestnut oak, water oak, Nuttall oak, overcup oak, white oak, willow oak, and American sycamore.
Group 6: Moderately well drained soils in alluvium of loessal and Coastal Plain material— Collins silt loam (Cm). Collins silt loam, local alluvium (Co). Mixed alluvial land (Mx).	Cherrybark oak Cottonwood Sweetgum	100 to 119 115 to 124 105 to 114	Cottonwood, southern magnolia, cherrybark oak, Shumard oak, swamp chestnut oak, water oak, white oak, willow oak, sweetgum, American sycamore, black tupelo, water tupelo, and yellow-poplar.
Group 7: Somewhat poorly drained and moderately well drained soils with a strong fragipan— Calloway silt loam (CaA, CaB). Grenada silt loam (GrA, GrB, GrB2, GrB3, GrC2, GrC3, GrD2, GrD3).	Cherrybark oak Sweetgum Loblolly pine Shortleaf pine	85 to 94 80 to 89 82 73	*On eroded and severely eroded soils*—loblolly pine and shortleaf pine. *On middle and low slopes of uneroded soils*—cherrybark oak, Shumard oak, water oak, white oak, and sweetgum.
Group 8: Poorly drained, nearly level and depressional soil with a strong fragipan— Henry silt loam (He).	Cherrybark oak Sweetgum Loblolly pine	75 to 84 70 to 79 85	Loblolly pine and sweetgum.
Group 9: Moderately well drained and well drained soils in loessal material on uplands— Loring silt loam (LoB2, LoB3, LoC, LoC2, LoC3, LoD, LoD2, LoD3, LoE2, LoE3). Memphis silt loam (MeB2, MeB3, MeC3). Memphis and Loring silt loams (MlF2, MlF3). Memphis, Natchez, and Guin soils (MnF2).	Cherrybark oak Sweetgum Loblolly pine Shortleaf pine	100 to 109 95 to 104 87 62	*Eroded areas*—loblolly pine. *Noneroded areas, upper slopes, and ridgetops*—cherrybark oak, Shumard oak, and white oak. *Middle and low slopes*—white ash, green ash, basswood, black cherry, cucumbertree, southern magnolia, cherrybark oak, chinkapin oak, black oak, Shumard oak, southern red oak, water oak, white oak, common persimmon, eastern redcedar, sassafras, sweetgum, black tupelo, and yellow-poplar.
Group 10: Poorly drained soil in local alluvium that washed from the loessal uplands— Waverly silt loam (Wa).			Baldcypress, white ash, green ash, Nuttall oak, overcup oak, and water tupelo.

[1] Site indexes for pines are estimated from sites in nearby counties. Site indexes for hardwards are from U.S. Department of

suitability groups of soils

not ordinarily grow on the soil listed. Site indexes listed do not apply to hardwoods on eroded soils]

Plant competition	Seedling mortality	Windthrow hazard	Equipment limitation	Erosion hazard
Moderate or severe	Slight	Slight	Severe	Slight.
Moderate or severe	Slight	Slight	Severe	Slight.
Slight or moderate	Slight	Slight	Slight or moderate	Moderate or severe.
Moderate or severe	Moderate or severe	Slight or moderate	Moderate or severe	Severe.
Moderate	Slight	Slight	Moderate	Slight.
Moderate	Slight	Slight	Moderate	Slight.
Slight or moderate	Slight	Slight or moderate	Slight	Slight or moderate.
Severe	Moderate	Moderate or severe	Moderate	Slight.
Slight or moderate	Slight	Slight	Slight or moderate	Slight to severe.
Moderate or severe	Slight	Slight	Severe	Slight.

Agriculture, Forest Service, Occasional Papers (7).

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stand at 50 years of age. For cottonwood the age is 30 years. The site index for each soil is determined mainly by the capability of that soil to provide moisture and growing space for tree roots. The site index in table 9 is an average for all the soils in the suitability group. Because not enough data are available, site indexes are not listed for some species. The site indexes listed in table 9 do not apply to hardwoods on eroded soils.

Also listed in table 9 for each woodland suitability group are trees suited to the soils in the group, as well as ratings for the limitations that affect management. The limitations rated are plant competition, seedling mortality, windthrow hazard, equipment limitation, and erosion hazard. The ratings are expressed in relative terms—slight, moderate, or severe—and are explained in the following pages.

PLANT COMPETITION: When a woodland is disturbed by fire, cutting, grazing, or some other means, undesirable brush, trees, and plants may invade. The invading growth competes with the desirable trees and hinders their establishment and growth.

Competition is *slight* if unwanted plants are no special problem. It is *moderate* if the invaders delay but do not prevent the establishment of a normal, fully stocked stand. Where plant competition is moderate, seedbed preparation is generally not needed and simple methods can be used to prevent undesirable plants from invading. Competition is *severe* if trees cannot regenerate naturally. Where competition is severe, carefully prepare the site and use management that includes controlled burning, spraying with chemicals, and girdling.

SEEDLING MORTALITY: Even when healthy seedlings of a suitable tree are correctly planted or occur naturally in adequate numbers, some of them will not survive if characteristics of the soil are unfavorable.

Mortality is *slight* if not more than 25 percent of the planted seedlings die, or if trees ordinarily regenerate naturally in places where there are enough seeds. It is *moderate* if 25 to 50 percent of the seedlings die, or if trees do not regenerate naturally in numbers needed for adequate restocking. In some places, replanting to fill open spaces will be necessary. Mortality is *severe* if more than 50 percent of the planted seedlings die, or if trees do not ordinarily reseed naturally in places where there are enough seeds. If mortality is severe, plant seedlings where the seeds do not grow, prepare special seedbeds, and use good methods of planting to insure a full stand of trees.

WINDTHROW HAZARD: Soil characteristics affect the development of tree roots and firmness with which the roots anchor the tree in the soil so that it resists the force of the wind. Root development may be prevented by a high water table or by an impermeable layer. The protection of surrounding trees also affects windthrow hazard. Knowing the degree of this hazard is important when choosing trees for planting and when planning release cuttings or harvest cuttings.

The windthrow hazard is *slight* if roots hold the tree firmly against a normal wind. Individual trees are likely to remain standing if protective trees on all sides are removed. The hazard is *moderate* if the roots develop enough to hold the tree firmly except when the soil is excessively wet and the wind velocity is very high. It is *severe* if rooting is not deep enough to give adequate stability. On soils with a rating of severe, individual trees are likely to be blown over if they are released on all sides.

EQUIPMENT LIMITATION: Drainage, slope, soil texture, or other soil characteristics may restrict or prohibit the use of ordinary equipment in pruning, thinning, harvesting, or other woodland management. Different soils may require different kinds of equipment, methods of operation, or seasons when equipment may be used.

Limitation is *slight* if there are no restrictions on the type of equipment or on the time of year that the equipment can be used. It is *moderate* if slopes are moderately steep, if heavy equipment is restricted by wetness in winter and early in spring, or if the use of equipment damages the tree roots to some extent. Equipment limitation is *severe* if many types of equipment cannot be used, if the time equipment cannot be used is more than 3 months a year, and if the use of equipment severely damages the roots of trees and the structure and stability of the soil. It is also severe on wet bottom lands and low terraces in winter or early in spring.

EROSION HAZARD: Woodland can be protected from erosion by adjusting the rotation age and cutting cycles, by using special techniques in management, and by carefully constructing and maintaining roads, trails, and landings.

Erosion hazard is rated according to the risk of erosion on well-managed woodland that is not protected by special practices. It is *slight* where a small loss of soil is expected. Generally, erosion is slight if slopes range from 0 to 2 percent and runoff is slow or very slow. The erosion hazard is *moderate* where there will be a moderate loss of soil if runoff is not controlled and the plant cover is not adequate for protection. It is *severe* where steep slopes, rapid runoff, slow infiltration, slow permeability, and past erosion make the soil susceptible to severe erosion.

WOODLAND SUITABILITY GROUP 1

This group consists of fine-textured, very slowly permeable, level or nearly level soils on the Mississippi River alluvial plain. They are—

Alligator clay, 0 to ½ percent slopes.
Alligator clay, ½ to 2 percent slopes.
Alligator silt loam, overwash, ½ to 2 percent slopes.
Alligator silty clay loam, 0 to ½ percent slopes.
Alligator silty clay loam, ½ to 2 percent slopes.

The clay to silt loam surface layer of these soils is underlain by clay. Drainage is poor, and water is on or near the surface much of the time. The available water-holding capacity is high.

The soils in this group are suited to willow oak, cherrybark oak, Nuttall oak, overcup oak, water oak, sweetgum, cottonwood, common persimmon, green ash, red maple, and pecan. Pine trees do not grow on these soils.

Plant competition is moderate or severe and depends on the way these soils are managed and trees are harvested. Where competition is moderate, competing plants delay natural regeneration and slow the initial growth of trees, but they do not prevent desirable trees from forming an adequate stand. Where competition is severe, the competing plants should be destroyed by burning, by spraying with chemicals, and by clearing or disking. Desirable

trees can be encouraged to restock by preparing a suitable seedbed.

Seedling mortality is generally slight where floods are not severe and enough light comes through the canopy. The loss of planted stock is less than 25 percent. The windthrow hazard is slight; individual trees can be expected to remain standing when released on all sides. Because these poorly drained soils have water on or near the surface much of the time, the use of equipment is restricted for 3 to 6 months or longer each year.

WOODLAND SUITABILITY GROUP 2

Dowling silty clay and clay are the only soils in this group. These fine-textured soils are in depressions of the Mississippi River alluvial plain. The silty clay or clay surface soil is underlain by clay. These soils are very slowly permeable, are poorly drained internally, and have high available water-holding capacity. Water stands on the surface much of the time.

These soils probably are best suited to baldcypress, but they are also suited to green ash, water tupelo, black willow, and other hardwoods. Pine trees do not grow on these soils.

Plant competition is moderate or severe and depends on how the soils are managed and the trees are harvested. Where competition is moderate, competing plants delay natural regeneration and slow initial growth, but they do not prevent desirable trees from forming an adequate stand. Where competition is severe, competing plants can be destroyed by burning, by spraying with chemicals, and by clearing and disking. Desirable trees restock if a suitable seedbed is prepared.

Unless flooding is severe, seedling mortality is slight. The windthrow hazard is also slight, and individual trees can be expected to remain standing when released on all sides. The equipment limitation is severe. In wet years the use of equipment is restricted for 3 to 6 months or longer.

WOODLAND SUITABILITY GROUP 3

This group consists of fine textured to coarse-textured soils in loessal and Coastal Plain materials. The soils are—

- Cuthbert and Providence soils, 12 to 35 percent slopes, eroded.
- Ruston, Providence, and Eustis soils, 12 to 17 percent slopes, eroded.
- Ruston, Providence, and Eustis soils, 17 to 35 percent slopes, eroded.

These soils account for about 7 percent of the woodland in the county. They are on narrow ridges and steep side slopes and generally have rapid runoff. Erosion, however, is only moderate.

These soils are best suited to hardwoods. Loblolly pine and shortleaf pine grow well in most areas, but not in drains and on the lower parts of slopes.

Plant competition is slight or moderate. Competing plants do not prevent desirable trees from forming a stand, but they may delay natural regeneration and slow initial growth.

Seedling mortality is slight if there is enough rain. The hazard of windthrow is slight; individual trees can be expected to remain standing if they are exposed to normal winds.

The equipment limitation is slight or moderate. In steep, rough areas the use of equipment is sometimes restricted. Erosion is a moderate or severe hazard. Further damage through erosion can be reduced by building roads, clearing for firebreaks, digging furrows, and doing other forestry work on the contour.

WOODLAND SUITABILITY GROUP 4

This group consists of two land types that are eroded and gullied. They are—

- Gullied land, sandy.
- Gullied land, silty.

These land types account for 25 percent of the county and make up the largest woodland suitability group. The soil material is thick loess and Coastal Plain material.

These land types should be given first priority in tree planting so that the loss of soil through erosion is reduced. At present loblolly pine is the best tree to plant, and the only one that is economically feasible. Since 1950 the Soil Conservation Service and the U.S. Forest Service have planted 25,000 acres of loblolly pine through the Yazoo-Tallahatchie watershed program. Of that acreage, about 80 percent is on these Gullied lands. Planting continues at a rate between 4 and 5 million trees each year, mainly on Gullied lands and areas where sheet erosion is active.

The site index of Gullied lands is not listed in table 9 for loblolly pine or other trees. The site index was omitted because the soil material is variable, erosion has been severe, and the stands of planted trees are not old enough to study. But trees planted on Gullied lands between 1938 and 1940 by the Civilian Conservation Corps were checked, and this check indicates that the growing of pine is economical and the best land use. A study was made of 20-year-old stands of loblolly pine. On the stands where 70 percent or more of the seedlings survive, the annual average yield for the first 20 years is 1 to 1¼ cords per acre. In addition to yielding forest products, the pines improve this land by improving its ability to take in water and by arresting erosion. Thus, farm income can be increased if loblolly pine is planted on the Gullied lands and the trees are protected from fire and harmful grazing.

Plant competition and seedling mortality are moderate or severe on Gullied lands, and there will be skips, or openings, in planted areas. These openings should be planted in the third year. Thinning is also needed. The first two thinnings should be light so that the trees can adjust to the additional space. If the thinnings are wide enough to completely free each tree, the windthrow hazard will be moderate.

Equipment limitation is moderate or severe, and the erosion hazard is severe. So that this land will be disturbed as little as possible, care should be taken in locating roads and skid trails and in selecting logging equipment. If tree-length logs are moved, skid the logs uphill and keep the butt either raised or in a skidding pan. If 5-foot pulpwood sticks are cut in the woods, use slides to move the sticks to loading points.

WOODLAND SUITABILITY GROUP 5

This group consists of soils formed in local alluvium that washed from loess covered uplands. These soils are —

- Falaya silt loam.
- Falaya silt loam, local alluvium.
- Falaya silty clay loam.
- Falaya and Waverly silt loams.

The surface soil and subsoil of these soils are silt loam to silty clay loam. Most areas are somewhat poorly

drained, and some areas are poorly drained. In some places water stands on or is near the surface much of the time. Permeability is moderate to slow, and the available moisture-holding capacity is high.

The soils in this group are best suited to hardwoods and, if planted to pine, revert naturally to hardwoods unless the pine is replanted after harvest. Suitable hardwoods are white ash, green ash, cottonwood, red maple, cherrybark oak, Nuttall oak, overcup oak, swamp chestnut oak, water oak, white oak, willow oak, sweetgum, and American sycamore.

Plant competition is moderate. It does not prevent desirable trees from forming a stand, but it often delays natural regeneration of trees and slows their initial growth.

Seedling mortality generally is slight where enough light gets through the canopy and flooding is not severe. Windthrow is slight; individual trees can be expected to remain standing when released on all sides. The use of equipment is restricted in 1 to 3 months of the year.

WOODLAND SUITABILITY GROUP 6

This group consists of soils and a land type in alluvium of loessal and Coastal Plain materials. The soils are—

- Collins silt loam.
- Collins silt loam, local alluvium.
- Mixed alluvial land.

The Collins soils formed in alluvium that washed from areas covered with loess. Their silt loam surface layer is underlain by silt loam to silty clay loam. Mixed alluvial land formed in alluvium of Coastal Plain material and has variable texture.

Hardwoods are native to these soils and regenerate naturally. Fields that have been cleared and planted to loblolly pine revert to hardwoods after the pine is harvested. Suitable hardwoods are cottonwood, southern magnolia, cherrybark oak, Shumard oak, swamp chestnut oak, water oak, white oak, willow oak, sweetgum, American sycamore, black tupelo, water tupelo, and yellow-poplar.

Plant competition, though moderate, does not prevent desirable trees from forming adequate stands, but competing plants often delay the natural regeneration of trees and slow their initial growth.

If flooding is not severe, seedling mortality is generally slight where the seedlings get enough light. The windthrow hazard is slight; individual trees can be expected to remain standing when released on all sides. The use of equipment is restricted for 1 to 3 months each year.

WOODLAND SUITABILITY GROUP 7

This group consists of somewhat poorly drained and moderately well drained soils with a strong fragipan. They are—

- Calloway silt loam, 0 to 2 percent slopes.
- Calloway silt loam, 2 to 5 percent slopes.
- Grenada silt loam, 0 to 2 percent slopes.
- Grenada silt loam, 2 to 5 percent slopes.
- Grenada silt loam, 2 to 5 percent slopes, eroded.
- Grenada silt loam, 2 to 5 percent slopes, severely eroded.
- Grenada silt loam, 5 to 8 percent slopes, eroded.
- Grenada silt loam, 5 to 8 percent slopes, severely eroded.
- Grenada silt loam, 8 to 12 percent slopes, eroded.
- Grenada silt loam, 8 to 12 percent slopes, severely eroded.

These nearly level to strongly sloping soils formed in loessal material. Their silt loam surface soil is underlain by silty clay loam. The fragipan is at a depth of 16 to 28 inches and is 24 inches or more thick. It limits the root zone and thereby the moisture available to plants.

In this group the uneroded soils, especially on the middle and lower parts of slopes, are best suited to hardwoods. Most suitable hardwoods are cherrybark oak, Shumard oak, water oak, white oak, and sweetgum. The eroded and severely eroded soils are best suited to loblolly pine and shortleaf pine.

Plant competition is slight or moderate. It often delays the natural regeneration of trees and slows their initial growth, but it does not prevent desirable trees from forming an adequate stand.

Seedling mortality is slight. In years of normal rainfall, only one planting is needed, for less than 25 percent of the planted trees are lost. The loss is much greater when there is not enough rainfall, and additional plantings are needed to fill the openings.

The windthrow hazard is slight or moderate because the fragipan keeps trees from rooting deeply. Except in the low, flat areas that stay wet for 1 to 3 months, equipment can be used all year.

WOODLAND SUITABILITY GROUP 8

Henry silt loam is the only soil in this group. This poorly drained soil is in loessal material on flats and in depressions. The silt loam surface soil is underlain by silty clay loam. A strong fragipan is at a depth of about 10 to 20 inches and limits the amount of water available to plants.

This soil is best suited to loblolly pine and sweetgum, but the sweetgum commonly has dieback and generally does not grow to maturity. The dieback is probably caused by a scarcity of water.

Competition from undesirable plants is severe and often prevents trees from forming a good stand. Restocking through natural regeneration may not be adequate. A well-prepared seedbed will be helpful in obtaining a good stand.

Windthrow is a moderate or severe hazard because roots cannot penetrate the fragipan and, consequently, do not hold the trees firmly enough to withstand wind. Ponding sometimes limits the use of equipment.

WOODLAND SUITABILITY GROUP 9

This group consists of moderately well drained and well drained soils in loessal material on uplands. The soils are—

- Loring silt loam, 2 to 5 percent slopes, eroded.
- Loring silt loam, 2 to 5 percent slopes, severely eroded.
- Loring silt loam, 5 to 8 percent slopes.
- Loring silt loam, 5 to 8 percent slopes, eroded.
- Loring silt loam, 5 to 8 percent slopes, severely eroded.
- Loring silt loam, 8 to 12 percent slopes.
- Loring silt loam, 8 to 12 percent slopes, eroded.
- Loring silt loam, 8 to 12 percent slopes, severely eroded.
- Loring silt loam, 12 to 17 percent slopes, eroded.
- Loring silt loam, 12 to 17 percent slopes, severely eroded.
- Memphis silt loam, 2 to 5 percent slopes, eroded.
- Memphis silt loam, 2 to 5 percent slopes, severely eroded.
- Memphis silt loam, 5 to 8 percent slopes, severely eroded.
- Memphis and Loring silt loams, 17 to 35 percent slopes, eroded.
- Memphis and Loring silt loams, 17 to 35 percent slopes, severely eroded.
- Memphis, Natchez, and Guin soils, 17 to 40 percent slopes, eroded.

These gently sloping to very steep soils have a silt loam surface soil that is underlain by silt loam to silty clay loam.

Internal drainage is moderate, and the available moisture-holding capacity is high.

Pine grows better than hardwoods on the severely eroded soils in this group, but hardwoods grow better than pine on the less eroded soils. Hardwoods grow much better than pine on steep slopes and on the middle and lower parts of slopes. Well-suited hardwoods that occur commonly are cherrybark oak, white oak, Shumard oak, black oak, water oak, sweetgum, and yellow-poplar.

Plant competition is slight or moderate. It delays the natural regeneration of trees and slows their initial growth, but it does not prevent desirable trees from forming a stand. A specially prepared seedbed generally is not needed.

Seedling mortality varies. Generally, less than 25 percent of the planted seedlings die, but if there is not enough rain, 25 to 50 percent die and should be replaced. Many of the galled and gullied areas of these soils require mulching.

Windthrow is not a serious hazard, for individual trees probably will remain standing when released on all sides. If some trees are cut, exposed trees will remain standing unless winds are abnormally strong.

The equipment limitation is slight or moderate. On some of these soils, the steep slopes and erosion hazard limit the use of mechanical tree planters and other machines.

The erosion hazard is slight to severe. Especially on the steep slopes, care should be taken in logging and in locating roads and skid trails.

WOODLAND SUITABILITY GROUP 10

Waverly silt loam is the only soil in this group. This silty soil is in local alluvium that washed from the loessal uplands. The silt loam surface soil is underlain by silt loam to silty clay loam. This soil is poorly drained, is moderate to slow in permeability, and is high in available moisture-holding capacity. The water table is at or near the surface much of the time.

Because hardwoods are better suited to this soil than pine, fields that have been cleared of hardwoods and planted to loblolly pine revert to hardwoods after the pine is harvested. Suitable hardwoods are white ash, green ash, Nuttall oak, overcup oak, and water tupelo. Baldcypress is well suited.

Plant competition is moderate or severe. If competition is moderate, natural regeneration of trees is delayed and initial growth is slowed, but competing plants do not prevent desirable trees from forming an adequate stand. If plant competition is severe, competing plants should be destroyed by burning, spraying with chemicals, and clearing or disking. Preparing a suitable seedbed will help the desired trees to restock.

Seedling mortality is generally slight unless flooding is severe. Windthrow is not a serious hazard, and individual trees can be expected to remain standing when released on all sides. Because this soil is poorly drained and is sometimes flooded, the equipment limitation is severe. The use of equipment is restricted for 3 to 6 months or longer in some years.

Use of the Soils for Wildlife Food and Cover [3]

The use and management of soils for wildlife food and cover are discussed in four areas. These areas are (1) the western part of the Mississippi River alluvial plain, (2) the eastern part of the Mississippi River alluvial plain, (3) the loessal area, and (4) the Coastal Plain area.

Western part of the Mississippi River alluvial plain

This is the part of the county occupied by the Alligator-Dowling soil association. The Alligator and Dowling soils are in alluvium from the Mississippi River. They are poorly drained, acid clays in flats and depressions of slack-water areas. These soils are locally called Buckshot land.

Habitats for wildlife are fair to good in the western part of the Mississippi River alluvial plain. Much of the area is wooded, and soybeans are the main crop. Quail feed on the soybeans and find cover on ditchbanks, in woods, and in idle fields. The quail can be attracted to the area and their number increased (1) by leaving a narrow strip of soybeans unharvested near good cover, (2) by allowing native plants to grow along fence rows and ditchbanks, and (3) by refraining from burning natural cover until about the middle of March. Dove abound in this area and eat waste soybeans in fall and early in winter.

Rabbit, mainly swamp rabbit, are generally plentiful and do not need special management of wildlife areas. Squirrel are fairly abundant in wooded areas and increase in number if hardwoods are managed to supply more food and cover. Deer browse in the large wooded areas. These animals benefit if the woodland is managed to improve hardwoods and if forage is planted for winter feeding.

The few duck in the area find some natural food in the lakes, streams, and bayous, but they need more food and cover than is available. Parts of this area that have enough available water can be flooded because most of the soils are not permeable and will hold water. If at least 50 percent of the trees in a wooded area are oak, the area is suitable for flooding to make duck ponds. Such flooded areas furnish plenty of acorns, especially after winter rains. Browntop millet and other plants can be planted and flooded to supply additional food for duck.

Eastern part of the Mississippi River alluvial plain

This area extends from the Alligator-Dowling soil association eastward to the bluffs at the edge of the loessal area. It coincides with the Falaya-Waverly-Collins association. The acid Falaya, Waverly, and Collins soils are in level or nearly level alluvium and are moderately well drained to poorly drained. They are excellent soils for farming and are cropped intensively to cotton, corn, grain sorghum, and other crops.

But game birds other than dove are not plentiful on farms, because farmers clean till their fields and use insecticides extensively on cotton. Consequently, little food and cover is available to wildlife. The number of game birds can be increased if parts of this area are managed to develop suitable habitats for wildlife.

Quail will be attracted and their number increased if farmers permit existing plants to grow adjacent to fields

[3] E. D. SULLIVAN, biologist, Soil Conservation Service, assisted in writing this subsection.

of soybeans, browntop millet, or cowpeas, or if they make plantings to provide cover for the quail. Quail also eat waste corn and grain sorghum in areas where there is enough cover nearby. Dove are abundant in this eastern area and in fall and winter are attracted to fields of corn and grain sorghum, where they eat the waste grain. In areas near cover where waste grain is not available, browntop millet can be planted to provide food for dove.

Rabbit generally live along ditchbanks and at the edge of fields. These animals can be increased by allowing plants to grow naturally on the ditchbanks and by planting crops in small strips to supply food in winter.

Loessal area

This area occupies a wide strip in the central part of the county. It is between the eastern part of the Mississippi River alluvial plain and the Coastal Plain. The area is made up mainly of Collins, Falaya, Grenada, and Loring soils. These soils are well drained to poorly drained, nearly level to very steep, and acid to alkaline. They are in loess that is at least 4 feet thick. This area is in farms, woods, and pasture. The wooded parts are the best habitats for game, and game is plentiful in these parts. Most of the large acreage in pasture does not furnish enough food and cover for game.

Quail are important game birds in the loessal area. They like annual lespedeza, which grows wild or is cultivated. Annual lespedeza is especially well suited to the soils in this area. The number of quail can be increased by maintaining stands of common lespedeza near places that provide cover, or by planting near cover common, kobe, Korean, bicolor, or japonica lespedeza. Each covey of quail needs patches of shrub lespedeza (bicolor or japonica) that total 1/8 to 1/4 acres in size, or patches of other food that total 1/2 to 1 1/2 acres in size. The patches of plantings or plants that grow naturally should be spaced on a farm so that one covey of quail will live on each 25 to 30 acres of land.

Cottontail rabbit are abundant. These animals can be fed and protected by leaving enough cover along fence rows and field borders and in odd corners, and by providing small patches and strips of forage for food in winter. In pasture that is grazed in winter, rabbit can be increased by providing cover plants along fences and edges of fields. Living fences of multiflora roses furnish good cover and travel lanes for rabbit.

Dove are plentiful in fall and winter if there is enough food. They are attracted by corn, grain sorghum, and browntop millet.

Squirrel abound in a steep, wooded strip adjacent to the Mississippi River Delta. This strip is 2 to 3 miles wide and is mainly in hardwoods. Oak is grown commercially on this strip, but there are also some hickory trees. If this woodland is managed to favor hardwoods, and some of the hickory trees are left standing when the oak is cut, the squirrel will be provided with protection and plenty of food. East of this steep strip, squirrel are less plentiful because the stands of hardwoods are fewer. The pure stands of pine in this area are not well suited to squirrel.

Deer and a few turkey live in the larger, wooded areas, where native plants furnish most of the food needed. Additional food can be provided by planting patches of grain, grasses, or legumes in or next to the woods. These patches should be 1 to 10 acres in size.

Farm ponds are numerous in the loessal area. If they are stocked, fertilized, and otherwise well managed, the ponds produce 200 to 400 pounds of fish per acre each year (*6*). They also provide water for other wildlife.

Coastal Plain area

This area is in a strip, 3 to 5 miles wide, that is between the eastern edge of the loessal area and the Lafayette County line. The area is a steep to very steep upland area that consists mostly of Ruston, Providence, and Cuthbert soils. These acid soils formed in excessively drained to somewhat poorly drained, sandy and clayey material. The soils on bottom lands in this area are similar to the soils on bottom lands in the loessal area, but those adjacent to Sardis Reservoir are sandy.

Like those in the loessal area, the soils on the Coastal Plain are in crops, woods, and pasture and support the same kinds of game. Quail and rabbit are abundant and are mostly on farmland, but there is less cropland in the Coastal Plain area than in the loessal area. The quail and rabbit can be increased in number by providing cover near their food, or by providing food near the existing cover. Native plants, particularly common lespedeza, are easy to manage for quail. Rabbit live in and around fields and pasture. They will benefit if the cover is improved and plants are seeded in small patches near the cover.

Dove are less abundant in the Coastal Plain area than elsewhere in the county. Little waste corn is left for them because many of the cornfields are small and are harvested by hand. Browntop millet is suited to the soils in this area and, if planted, will attract dove and help them increase.

Squirrel are mostly in the wooded areas of bottom lands and slopes. These wooded areas contain enough hardwoods to support the squirrel, which can be increased by managing the areas to favor hardwoods. In areas that are being converted to pine, some hardwoods should be left or planted, even if the sites are small and can support only 8 or 10 trees.

Deer are increasing in the woodland, where they have enough natural food most of the year. Additional food can be provided for winter feeding by planting forage near the woods. This forage should be in patches that are well distributed and are 1 to 10 acres in size.

Farm ponds in the Coastal Plain area can be managed to produce high yields of fish (*5*). Like those in the loessal area, the ponds in this area will produce 200 to 400 pounds of fish per acre if they are stocked, fertilized, and otherwise well managed.

Formation and Classification of Soils

This section is in two main parts. The first part describes the factors of soil formation and their effect on the soils in Panola County. In the second part, the soil series are placed in their soil order and great soil group and the morphology of the soils is discussed.

Formation of Soils in Panola County

Soil is the product of soil-forming processes acting on parent material deposited or accumulated by geologic forces. The nature of the soil at any point depends on

the effects of parent material, plant and animal life, climate, topography, and time. Some combination of these five determines the characteristics of each soil. All five of these factors take part in the formation of every soil, but the relative importance of each differs from place to place. One or more of these factors may be important in one area, but a different factor or group of factors may dominate another area. Ordinarily, the differences between unlike soils of two distant areas are probably caused by differences in climate and parent material. The differences between adjacent soils, on the other hand, are probably caused by differences in topography or parent material. Thus, for every soil, the past combination of the five major factors is of first importance to its present character.

Parent material.—Parent material is the unconsolidated mass from which a soil develops. It is largely responsible for the chemical and mineralogical composition of soils. In Panola County the parent materials of the soils consist mainly of Mississippi River alluvium, loess, and Coastal Plain sediments.

The soils of the delta, in the western part of the county, formed in Mississippi River alluvium. Along the large streams in the county, the soils also formed in alluvium, which was deposited by those streams. Much of this material is silt from loessal areas, but some is sandy sediments of the Coastal Plain. The soils in most of the central part of the county formed in a thick mantle of loess. Loess is silty material that has been transported and deposited by wind. The soils in the eastern part of the county formed in sands and clays of the Coastal Plain that are underlain by the Kosciusko and Tallahatta formations.

The soils on first bottoms are weakly developed and still receive new deposits of soil material, but those on old, high terraces and benches have been in place long enough to have developed distinct horizons. Along drainageways throughout the uplands are narrow strips of local alluvium that have been modified very little, if any, by the processes of soil formation.

Plant and animal life.—Micro-organisms, plants, and all other organisms that live on and in the soil are indispensable in soil development. Bacteria, fungi, and other micro-organisms aid in weathering rock and in decomposing organic matter. Large plants alter the soil climate in small areas (soil microclimate). They also supply organic matter to the soil and transfer elements from the subsoil to the surface soil.

The kinds and numbers of plants and animals that live on and in the soil are determined mainly by the climate, but partly by parent material and relief.

Not much is known of the fungi and micro-organisms in the soils of this county, but they are mostly in the top few inches. The activity of earthworms and other small invertebrates is greatest in the surface layer, where it continually mixes the soil. Mixing of the soil material by rodents does not appear to have been of much consequence in Panola County.

The native vegetation on the hills in the county was chiefly hickory, red maple, red oak, and white oak. In addition to these trees, shortleaf pine grew on the eastern hills. On the delta and on well-drained bottom lands in the hills were ash, basswood, linden, beech, and other lowland hardwoods. On the poorly drained bottoms were cypress, cottonwood, and sweetgum. Cypress, willow, sycamore, and water oak grew on the heavy soils in the delta.

Climate.—Climate, as a genetic factor, affects a soil physically, chemically, and biologically through the influence of precipitation and temperature. Water dissolves minerals, supports biological activity, and transports mineral and organic residue through the soil profile. In a broad area the amount of water that actually percolates through the soil depends mainly on rainfall, relative humidity, and the length of the frost-free period. At a given point the amount of downward percolation is also affected by physiographic position and by soil permeability. Temperature influences the kinds and growth of organisms in the soil and the speed of physical and chemical reactions. Microclimatic variations cause certain characteristics of the soils to differ from those that developed under the prevailing macroclimate.

Under the present-day climate of Panola County, (see table 11, p. 58), the soils are moist and are likely to be leached most of the year. Freezing and thawing in this county have little effect on weathering and the soil-forming processes. From December 1 to March 1, the average temperature is about 44° F.

Topography.—Topography is largely determined by the general geologic history of a region, and by the underlying formations and the effects of dissection by rivers and streams. Topography influences soil formation through its effect on moisture, erosion, temperature, and plant cover, but the influence is modified by the other four factors of soil formation.

The slopes in Panola County range from 0 to 40 percent. In the upland areas the Grenada and other soils have a thick, well-developed profile in areas with slopes of less than 12 percent. On slopes of 12 to 40 percent, geologic erosion removes the soil material almost as quickly as it forms. As a result, the Guin and other soils on the steep slopes, have a thin, weakly developed profile. Most soils in alluvium in the county are level or nearly level and also have a weakly developed profile.

Time.—The length of time required for a soil to develop depends largely on the other four factors of soil formation. Less time generally is required for a soil to develop in humid, warm regions with luxuriant vegetation than is required in dry or cold regions with scanty vegetation. Also, other things being equal, less time is required if the parent material is coarse textured than if it is fine textured.

Geologically, the soil materials of Panola County are fairly young. The Coastal Plain materials were laid down by the seas during the Pliocene epoch. Later, during the ice age, most of the hilly parts of the county were covered by a thick mantle of loess. Thus, the soils of Panola County vary considerably in age. Generally, the old soils show a greater degree of horizon differentiation than the young soils. For example, soils on nearly level uplands and on old stream terraces have been in place long enough to develop distinct horizons, but on the strong slopes, geologic erosion has removed soil material so rapidly that distinct horizons have not formed. On the first bottoms and in areas of local alluvium, the soil materials have been in place too short a time to permit mature development.

Classification of Soils by Higher Categories

In the comprehensive system of soil classification followed in the United States, the soils are placed in six categories, one above the other. Beginning at the top, these categories are the order, suborder, great soil group, family, series, and type (*2, 4*).

In the highest category the soils are grouped in three orders; in the lowest category thousands of soil types are recognized. The suborder and family categories have never been fully developed and thus have been little used. Attention has largely been given to the classification of soils into soil types and series within counties or comparable areas and to the subsequent grouping of series into great soil groups and soil orders. The soil orders and great soil groups are discussed in this section. The soil series, types, and phases are discussed in the section "Descriptions of Soils."

Table 10 classifies the soil series in the county by order and great soil group and lists some factors that have contributed to their morphology.

TABLE 10.—*Soil series classified by higher categories, and the major factors that have contributed to differences in soil morphology*

ZONAL SOILS

Great soil group and series	Parent material	Slope range	Drainage class	Degree of profile development
		Percent		
Gray-Brown Podzolic soils:				
Memphis	Thick loess	0 to 40	Well drained	Strong.
Loring [1]	Thick loess	2 to 35	Moderately well drained and well drained.	Strong.
Grenada [1]	Thick loess	0 to 12	Moderately well drained	Strong.
Natchez	Thick loess	17 to 40	Well drained	Weak.
Red-Yellow Podzolic soils:				
Ruston	Sandy Coastal Plain material	12 to 35	Well drained	Medium.
Providence [1]	Thin loess over sandy Coastal Plain material.	12 to 35	Moderately well drained	Strong.
Cuthbert	Clayey Coastal Plain material	12 to 35	Moderately well drained	Medium.

INTRAZONAL SOILS

Great soil group and series	Parent material	Slope range	Drainage class	Degree of profile development
Planosols:				
Calloway	Thick loess	0 to 5	Somewhat poorly drained	Strong.
Henry	Thick loess	0 to 2	Poorly drained	Medium.
Low-Humic Gley soils:				
Alligator	Mississippi River alluvium	0 to 2	Poorly drained	Weak.
Dowling	Mississippi River alluvium	0 to 2	Poorly drained	Weak.
Waverly	Recent silty alluvium	0 to 2	Poorly drained	Weak.

AZONAL SOILS

Great soil group and series	Parent material	Slope range	Drainage class	Degree of profile development
Regosols:				
Guin	Sandy and gravelly Coastal Plain material.	17 to 40	Excessively drained	Weak.
Eustis	Sandy Coastal Plain material	12 to 35	Excessively drained	Weak.
Alluvial soils:				
Collins	Recent silty alluvium	0 to 3	Moderately well drained	Weak.
Falaya [2]	Recent silty alluvium	0 to 3	Somewhat poorly drained	Weak.

[1] Soils intergrade toward Planosols.

[2] Soils intergrade toward Low-Humic Gley soils.

The classes in the highest category of the classification scheme are the zonal, intrazonal, and azonal orders.

Zonal order

In the zonal order are soils with evident, genetically related horizons that reflect the predominant influence of climate and living organisms in their formation. Zonal soils in Panola County are of the Gray-Brown Podzolic and the Red-Yellow Podzolic great soil groups.

GRAY-BROWN PODZOLIC SOILS

This great soil group consists of well-developed, well drained and moderately well drained, acid soils that formed under deciduous forest vegetation in a humid, temperate climate. The soils have thin A_0 and A_1 horizons over a brown or grayish-brown A_2 horizon that, in turn, is underlain by a dark-brown, more clayey B_2 horizon.

In general the soils of this group have a moderate cation-exchange capacity and a base saturation of 35 percent or

more. Illite is the dominant clay mineral. The subsoil has a moderate to strong, subangular blocky structure and is of a medium to high chroma.

Most of the Gray-Brown Podzolic soils in Panola County have a well-defined A_2 horizon that has a weak, granular or crumb structure and contains not more than 1 percent organic matter. These soils are medium acid or strongly acid in the A_2 horizon. Their B_2 horizon has moderate, fine or medium, subangular blocky structure and contains more clay than the A_2 horizon. The structure of the C horizon is not so strong as that of the B_2 horizon, and the proportion of clay is generally less in the C. All Gray-Brown Podzolic soils in Panola County have formed in thick deposits of loess. They are of the Memphis, Loring, Grenada, and Natchez series.

Memphis series.—The soils of the Memphis series are representative Gray-Brown Podzolic soils. They are on slopes of 0 to 40 percent. The B_2 horizon has subangular blocky structure and is brown or dark-brown (7.5YR 4/4) heavy silt loam or light silty clay loam. The C horizon of brown or dark-brown (7.5YR 4/4) to yellowish-brown (10YR 5/6) silt loam is structureless or has weak, subangular blocky structure. Three profiles of Memphis silt loam are described.

Profile No. 1—Memphis silt loam, 2 to 5 percent slopes, eroded, in an idle field 8 miles southwest of Batesville (NW¼SE¼ sec. 33, T. 9 S., R. 8 W.):

- A_{p1}—0 to 2 inches, brown or dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; many fine roots; strongly acid; clear, smooth boundary.
- A_{p2}—2 to 4 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; friable; many fine roots; very strongly acid or strongly acid; clear, smooth boundary.
- B_{21}—4 to 9 inches, brown or dark-brown (7.5YR 4/4) heavy silt loam; moderate, fine and medium, subangular blocky structure; many coarse worm casts; friable; many fine roots; very strongly acid; clear, smooth boundary.
- B_{22}—9 to 19 inches, brown or dark-brown (7.5YR 4/4) light silty clay loam; moderate, fine and medium, subangular blocky structure; common coarse worm casts; friable; common fine roots; very strongly acid or strongly acid; clear, smooth boundary.
- B_{23}—19 to 31 inches, brown or dark-brown (7.5YR 4/4) heavy silt loam; moderate, medium, subangular blocky structure; friable; few fine roots; common light-gray (10YR 7/2) coatings of silt on ped faces and in cracks; strongly acid; clear, smooth boundary.
- B_3—31 to 53 inches, brown or dark-brown (7.5YR 4/4) silt loam; moderate, medium, subangular blocky structure; friable; few fine concretions of manganese; few fine roots; few light-gray (10YR 7/2) coatings of silt on ped faces and in cracks; strongly acid; clear, smooth boundary.
- C—53 to 65 inches +, brown or dark-brown (7.5YR 4/4) silt loam with common, fine, faint, dark yellowish-brown (10YR 4/4) mottles; weak, fine and medium, subangular blocky structure; friable; few fine concretions of manganese; common light-gray (10YR 7/2) coatings of silt on ped faces and in cracks; strongly acid.

Profile No. 2—An eroded Memphis silt loam on slopes of 17 to 35 percent, in woods 11 miles northwest of Batesville (NW¼SW¼ sec. 21, T. 8 S., R. 8 W.):

- A_p—0 to 5 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; many fine roots; strongly acid; clear, smooth boundary.
- B_2—5 to 17 inches, brown or dark-brown (7.5YR 4/4) light silty clay loam; moderate, fine and medium, subangular blocky structure; friable; common fine roots; strongly acid; clear, smooth boundary.
- B_3—17 to 30 inches, brown or dark-brown (7.5YR 4/4) heavy silt loam; weak, medium, subangular blocky structure; friable; few fine concretions of manganese; few fine roots; several narrow, vertical cracks filled with white (10YR 8/1) silt loam; strongly acid; clear, smooth boundary.
- C_1—30 to 44 inches, brown or dark-brown (7.5YR 4/4) silt loam; structureless; friable; few fine roots; several large, vertical cracks filled with white (10YR 8/1) silt loam; strongly acid; clear, smooth boundary.
- C_2—44 to 56 inches +, yellowish-brown (10YR 5/4) silt loam; structureless; friable; several narrow, vertical cracks filled with white (10YR 8/1) silt loam; slightly acid.

Profile No. 3—An eroded Memphis silt loam on slopes of 17 to 40 percent, in woods 12 miles southwest of Batesville (NW¼NW¼ sec. 16, T. 10 S., R. 8 W.):

- A_p—0 to 6 inches, brown or dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; many fine roots; strongly acid; clear, smooth boundary.
- B_{21}—6 to 16 inches, brown or dark-brown (7.5YR 4/4) light silty clay loam; weak, fine and medium, subangular blocky structure; friable; common fine roots; strongly acid; clear, smooth boundary.
- B_{22}—16 to 25 inches, brown or dark-brown (7.5YR 4/4) heavy silt loam; weak, fine and medium, subangular blocky structure; friable; few fine roots; strongly acid or medium acid; clear, smooth boundary.
- B_3—25 to 49 inches, brown or dark-brown (7.5YR 4/4) silt loam; weak, fine and medium, subangular blocky structure; friable; few fine roots; strongly acid or medium acid; clear, smooth boundary.
- C—49 to 60 inches +, brown or dark-brown (7.5YR 4/4) silt loam; structureless; friable; few fine concretions of manganese; several large, vertical cracks filled with white (10YR 8/1) silt loam; slightly acid.

The B_2 horizon of the Memphis soils ranges from heavy silt loam to light silty clay loam in texture and from brown or dark brown to yellowish brown and strong brown in color. The C horizon generally is 10 to 30 feet thick and is brown or dark-brown to yellowish-brown silt loam. In the steep Memphis soils the B and C horizons are not so thick as those in the gently sloping Memphis soils.

Loring series. The soils in this series are on slopes of 2 to 35 percent. The B_2 horizon is brown or dark-brown (7.5YR 4/4) heavy silt loam or light silty clay loam of subangular blocky structure. These soils have a fragipan at a depth of about 30 inches and are, therefore, not so well drained as the Memphis soils, which lack a fragipan. The profiles described for the Loring soils do not extend to the C horizon, but the C horizon of Loring soils generally is similar to that of the Memphis soils.

The Loring soils are Gray-Brown Podzolic soils that intergrade toward the Planosol great soil group. Two profiles representative of Loring silt loam are described.

Profile No. 1—Loring silt loam, 2 to 5 percent slopes, eroded, in a wooded area 11 miles southeast of Batesville (SE¼NE¼ sec. 30, T. 9 S., R. 6 W.):

- A_p—0 to 5 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; friable; many fine roots; strongly acid; clear, smooth boundary.
- B_{21}—5 to 17 inches, brown or dark-brown (7.5YR 4/4) heavy silt loam with common, fine, faint, strong-brown (7.5YR 5/6) mottles; moderate, fine and medium, subangular blocky structure; friable; few fine concretions of manganese; many fine roots; strongly acid; clear, smooth boundary.
- B_{22}—17 to 27 inches, brown or dark-brown (7.5YR 4/4) light silty clay loam; moderate, medium, subangular blocky structure; friable; few fine roots; strongly acid; clear, smooth boundary.

B_{23}—27 to 33 inches, brown or dark-brown (7.5YR 4/4) heavy silt loam with few, fine, faint, strong-brown (7.5YR 5/6), and light yellowish brown (10YR 6/4) mottles; moderate, medium, subangular blocky structure; friable; few fine roots; strongly acid; abrupt, smooth boundary.

B_{3m1}—33 to 45 inches, mottled, brown or dark brown (7.5YR 4/4), strong-brown (7.5YR 5/6), and light yellowish-brown (10YR 6/4) silt loam; mottles are many, fine, and faint to distinct; moderate, medium, subangular blocky structure; compact and brittle in place and extremely hard when dry; common fine concretions of manganese; common very pale brown (10YR 7/3) coatings of silt in cracks and on ped faces; very strongly acid or strongly acid; clear, wavy boundary.

B_{3m2}—45 to 54 inches +, mottled, brown or dark-brown (7.5YR 4/4), yellowish brown (10YR 5/6), and light yellowish brown (10YR 6/4) silt loam; mottles are many, fine to coarse, and faint to distinct; moderate, coarse, subangular blocky structure; compact and brittle in place and extremely hard when dry; many fine concretions of manganese; few fine voids; many white (2.5Y 8/2) coatings of silt on ped faces and in cracks; very strongly acid or strongly acid.

Profile No. 2—Loring silt loam, 17 to 35 percent slopes, eroded, in a wooded area 9 miles southwest of Batesville (NE¼NE¼ sec. 4, T. 10 S., R. 8 W.):

A_1—0 to 2 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; friable; many fine roots; strongly acid; clear, wavy boundary.

A_2—2 to 6 inches brown (10YR 5/3) to brown or dark-brown (10YR 4/3) silt loam; weak, medium, granular structure; friable; many fine roots; strongly acid; clear, wavy boundary.

B_1—6 to 15 inches, brown or dark-brown (7.5YR 4/4) heavy silt loam; weak, fine, subangular blocky structure; friable; many fine roots; very strongly acid or strongly acid; clear, wavy boundary.

B_2—15 to 30 inches, brown or dark brown (7.5YR 4/4) heavy silt loam; moderate, medium, subangular blocky structure; friable; few fine concretions of manganese; common fine roots; very strongly acid or strongly acid; clear, wavy boundary.

B_{3m1}—30 to 42 inches, brown or dark brown (7.5YR 4/4) silt loam with common, fine, distinct, light-gray (10YR 7/2) and common, fine, faint, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; compact and brittle in place and extremely hard when dry; common fine concretions of manganese; strongly acid; clear, wavy boundary.

B_{3m2}—42 to 51 inches, brown or dark-brown (7.5YR 4/4) silt loam with common, fine, distinct, yellowish-brown (10YR 5/4) mottles; moderate, coarse, subangular blocky structure; compact and brittle in place and extremely hard when dry; common fine concretions of manganese; common light gray (10YR 7/2) coatings of silt on ped faces and in cracks; strongly acid; clear, wavy boundary.

B_{3m3}—51 to 59 inches +, mottled, brown or dark-brown (7.5YR 4/4), and yellowish-brown (10YR 5/4) silt loam; mottles are many, fine and medium, and faint; moderate, medium and coarse, subangular blocky structure; compact and brittle in place and extremely hard when dry; few fine manganese concretions; common light-gray (10YR 7/2) coatings of silt on ped faces and in cracks; very strongly acid.

The B_2 horizon of the Loring soils ranges from heavy silt loam to light silty clay loam and from brown or dark brown (7.5YR 4/4) to strong brown (7.5YR 5/6). The fragipan ranges from 30 to 42 inches in depth and from a few inches to 3 feet in thickness. The B_1 horizon may be absent.

Grenada series.—The soils of the Grenada series occupy slopes of 0 to 12 percent. Their B_2 horizon is brown or dark-brown (7.5YR 4/4) heavy silt loam to light silty clay loam of subangular blocky structure. These soils have a fragipan at a depth of about 24 inches and are not so well drained as the Memphis and Loring soils. The profile described for the Grenada soils does not extend to the C horizon, but the C horizon of Grenada soils generally is similar to that of the Memphis soils.

The Grenada soils are Gray-Brown Podzolic soils that intergrade toward the Planosol great soil group.

Representative profile of Grenada silt loam, 2 to 5 percent slopes, eroded, in a cultivated field 2 miles northeast of Como (NE¼NE¼ sec. 27, T. 6 S., R. 7 W.):

A_p—0 to 5 inches, brown or dark-brown (10YR 4/3) silt loam; weak, fine, subangular blocky structure; friable; many fine roots; strongly acid; clear, smooth boundary.

B_{21}—5 to 12 inches, brown or dark-brown (7.5YR 4/4) heavy silt loam; weak, medium, subangular blocky structure; friable; many fine roots; strongly acid; clear, smooth boundary.

B_{22}—12 to 23 inches, brown or dark-brown (7.5YR 4/4) heavy silt loam; moderate, medium, subangular blocky structure; friable; few fine concretions of manganese; common roots; strongly acid; clear, wavy boundary.

B_{3m1}—23 to 29 inches, mottled, yellowish brown (10YR 5/6), light yellowish-brown (10YR 6/4), and light gray (10YR 7/2) silt loam; mottles are many, fine, and distinct; moderate, fine and medium, subangular blocky structure; compact and brittle in place and extremely hard when dry; many fine and medium concretions of manganese; few fine roots; strongly acid; gradual, wavy boundary.

B_{3m2}—29 to 40 inches, mottled, brown or dark-brown (7.5YR 4/4), gray or light-gray (10YR 6/1), yellowish-brown (10YR 5/4), and pale-brown (10YR 6/3) silt loam; mottles are many, medium, and distinct; moderate, medium, subangular blocky structure; compact and brittle in place and extremely hard when dry; common fine and medium concretions of manganese; few fine voids; many white (10YR 8/1) coatings of silt on ped faces; very strongly acid; gradual, wavy boundary.

B_{3m3}—40 to 53 inches +, mottled, brown or dark-brown (7.5YR 4/4), and very pale brown (10YR 7/3) silt loam; mottles are many, medium, and distinct; moderate, medium and coarse, subangular blocky structure; compact and brittle in place and extremely hard when dry; common fine concretions of manganese; few fine voids; many white (10YR 8/1) coatings of silt on ped faces; very strongly acid.

The depth to the fragipan ranges from 22 to 29 inches. The A_p horizon ranges from dark grayish brown to brown, and the B_2 horizon ranges from brown or dark brown (7.5YR 4/4) to yellowish brown (10YR 5/8).

Natchez series.—The soils in this series have slopes of 17 to 40 percent. The B_2 horizon is brown or dark brown (7.5YR 4/4) like that in the Memphis, Loring, and Grenada soils, but its texture is silt loam instead of heavy silt loam to light silty clay loam. In most places the C horizon is like that in the Memphis soils. The Natchez soils are more alkaline throughout the profile than the Memphis, Loring, and Grenada soils but do not have so strongly developed structure.

Representative profile of Natchez silt loam, 17 to 40 percent slopes, eroded, in a wooded area half a mile northeast of Askew (NE¼NE¼ sec. 30, T. 6 S., R. 9 W.):

A_p—0 to 6 inches, brown or dark brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; few worm casts; many fine roots; slightly alkaline; clear, wavy boundary.

B_1—6 to 11 inches, brown or dark-brown (7.5YR 4/4) silt loam with many brown or dark-brown (10YR 4/3) worm casts from A_p horizon; weak, fine and medium, subangular blocky structure; friable; many fine roots; medium acid; clear, wavy boundary.

B_2—11 to 18 inches, brown or dark-brown (7.5YR 4/4) silt loam; weak, fine and medium, subangular blocky structure; friable; few fine concretions of manganese; many fine roots; slightly acid; clear, wavy boundary.

C_1—18 to 35 inches, yellowish-brown (10YR 5/6) silt loam; structureless; friable; many fine roots; neutral; abrupt, wavy boundary.

C_2—35 to 66 inches +, light yellowish-brown (10YR 6/4) silt loam; structureless; friable; few fine concretions of lime; no roots; slightly alkaline.

The B horizon ranges from brown or dark brown (7.5YR 4/4) to yellowish brown (10YR 5/6). The C horizon ranges from yellowish brown (10YR 5/6) to light yellowish brown (10YR 6/4).

RED-YELLOW PODZOLIC SOILS

This great soil group consists of well-developed, moderately well drained and well drained, acid soils that formed under forest vegetation in a warm-temperate, humid climate. These soils have a thin, organic A_0 horizon, a thin organic-mineral A_1 horizon, and a light-colored, bleached A_2 horizon. The A_2 is underlain by a more clayey B_2 horizon that is red, yellowish red, or strong brown. The parent materials are all more or less siliceous. The deep horizons have a network of coarse streaks or mottles of red, yellow, brown, and light gray.

Generally, the soils in this group have a low cation-exchange capacity and a low base saturation, commonly 15 to 20 percent. Kaolinite is the dominant clay mineral. The subsoil has moderate or strong, subangular blocky structure and is of medium to high chroma.

Most of the Red-Yellow Podzolic soils in Panola County have a well-defined A_2 horizon with weak, granular or crumb structure and an organic-matter content of not more than 1 percent. These soils are medium acid to strongly acid in the A_2 horizon and are strongly acid or very strongly acid in the B_2 horizon. They have weak to moderate, fine or medium, angular or subangular blocky structure in the B_2 horizon, which contains more clay than the A_2 horizon. The C horizon is free of mottles in some places and in other places has red, yellow, brown, and gray mottles. Its structure is not so strong as that of the B_2 horizon, and the proportion of clay is generally less.

Members of the Red-Yellow Podzolic great soil group in Panola County are of the Ruston, Providence, and Cuthbert series.

Ruston series.—The soils of the Ruston series are representative Red-Yellow Podzolic soils. They occupy slopes of 12 to 35 percent and have developed in sandy Coastal Plain material.

Representative profile of Ruston fine sandy loam, 17 to 35 percent slopes, eroded, in a wooded area 13 miles east of Batesville (SW¼NE¼ sec. 33, T. 8 S., R. 5 W.):

A_1—0 to 3 inches, very dark grayish-brown (10YR 3/2) fine sandy loam; weak, fine, granular structure; friable; many fine roots; strongly acid; clear, wavy boundary.

A_2—3 to 11 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, medium, granular structure; friable; many fine roots; strongly acid; clear, wavy boundary.

B_{21}—11 to 16 inches, yellowish-red (5YR 4/8) sandy clay loam; weak, fine and medium, subangular blocky structure; friable; many fine roots; strongly acid; clear, wavy boundary.

B_{22}—16 to 34 inches, red (2.5YR 4/8) sandy clay loam; weak, fine and medium, subangular blocky structure; friable; common fine roots; strongly acid; clear, wavy boundary.

C—34 to 51 inches +, mottled, dark-red (2.5YR 3/6), reddish-brown (5YR 5/3), and yellowish-red (5YR 4/8) loamy sand; structureless; loose; few fine roots; strongly acid.

The A horizon ranges from very dark grayish brown (10YR 3/2) to brown (10YR 5/3) in color and from loam to sandy loam in texture. The B_2 horizon ranges from strong brown (7.5YR 5/6) to red (2.5YR 4/8).

Providence series.—Soils of the Providence series formed in thin loess over Coastal Plain material. These soils occupy slopes of 12 to 35 percent. Their B_2 horizon is brown or dark-brown (7.5YR 4/4) to yellowish-brown (10YR 5/6) light silty clay loam of subangular blocky structure. A fragipan occurs at a depth of about 24 inches. The D horizon is loam or sandy loam with subangular and angular blocky structure. The Providence soils intergrade toward the Planosol great soil group. Two profiles representative of Providence silt loam are described.

Profile No. 1—Providence silt loam, 17 to 35 percent slopes, eroded, in an idle field 11 miles east of Batesville (SE¼NW¼ sec. 1, T. 9 S., R. 6 W.):

A_p—0 to 2 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, fine, granular structure; friable; many fine roots; strongly acid; clear, wavy boundary.

B_{21}—2 to 9 inches, strong-brown (7.5YR 5/6) light silty clay loam; weak, fine and medium, subangular blocky structure; friable; many fine roots; very strongly acid; clear, wavy boundary.

B_{22}—9 to 22 inches, strong brown (7.5YR 5/6) light silty clay loam; moderate, fine and medium, subangular blocky structure; friable; common fine roots; very strongly acid; clear, wavy boundary.

B_{3m}—22 to 32 inches, mottled, strong brown (7.5YR 5/6), light brownish-gray (10YR 6/2), and brown (10YR 5/3) silt loam; mottles are many, fine and medium, and distinct; moderate, medium and coarse, angular and subangular blocky structure; compact and brittle in place and extremely hard when dry; many fine concretions of manganese; few fine roots; strongly acid; clear, wavy boundary.

D_{1m}—32 to 43 inches, mottled, brownish-yellow (10YR 6/8), strong-brown (7.5YR 5/6), and white (10YR 8/1) loam; mottles are many, medium, and distinct; moderate, coarse, subangular and angular blocky structure; firm; many fine concretions of manganese; many voids; many white (10YR 8/1) coatings of silt in cracks and on ped faces; strongly acid; clear, wavy boundary.

D_{2m}—43 to 52 inches, mottled, strong-brown (7.5YR 5/6), brown or dark-brown (7.5YR 4/4), and white (10YR 8/1) loam; mottles are many, medium, and distinct; strong, coarse, angular blocky structure; firm; few concretions of manganese; many white (10YR 8/1) coatings of silt in cracks and on ped faces; strongly acid; clear, wavy boundary.

D_{3m}—52 to 61 inches, mottled, brownish-yellow (10YR 6/8), dark-red (2.5YR 3/6), and light-gray (10YR 7/2) fine sandy loam; mottles are many, fine and medium, and prominent; strong, coarse, subangular blocky structure; friable; strongly acid.

The A_p horizon ranges from dark grayish brown (10YR 4/2) to brown (10YR 5/3). Depth to the fragipan (B_{3m}) ranges from 18 to 29 inches.

Profile No. 2—Providence silt loam, 12 to 35 percent slopes, eroded, in an idle field 20 miles southeast of Batesville (SE¼NE¼ sec. 29, T. 10 S., R. 5 W.):

A_p—0 to 5 inches, brown or dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; many fine roots; strongly acid; clear, smooth boundary.

B_{21}—5 to 15 inches, brown or dark brown (7.5YR 4/4) light silty clay loam; moderate, fine and medium, subangular blocky structure; friable; common fine roots; strongly acid; clear, smooth boundary.

B_{22}—15 to 24 inches, yellowish-brown (10YR 5/6) silt loam; moderate, medium, subangular blocky structure; friable; few fine roots; strongly acid; abrupt, wavy boundary.

B_{3m}—24 to 34 inches, mottled, yellowish-brown (10YR 5/6), brown or dark-brown (7.5YR 4/4), and light-gray (10YR 7/2) silt loam; mottles are many, medium, and distinct; moderate, medium and coarse, subangular and angular blocky structure; compact and brittle in place and hard when dry; common fine concretions of manganese; strongly acid; clear, smooth boundary.

D_m—34 to 47 inches +, mottled, yellowish-brown (10YR 5/6), pale-brown (10YR 7/4), brown or dark-brown (7.5YR 4/4), and light-gray (10YR 7/2) loam; sandy in the lower part; mottles are many, medium, and distinct; moderate, medium and coarse, subangular and angular blocky structure; firm; few fine concretions of manganese; strongly acid.

The B horizon is brown or dark brown (7.5YR 4/4) to yellowish brown (10YR 5/6). There is a fragipan (B_{3m} layer) at a depth of 20 to 29 inches, but in some places there is a high percentage of sandy material at this depth.

Cuthbert series.—The soils in this series formed in sandy and clayey Coastal Plain material. They have slopes of 12 to 35 percent. The B_2 horizon is yellowish-red (5YR 4/8) sandy clay loam to clay loam and has angular blocky structure. The C horizon consists of clay or layers of clay and sand and is mottled with red, yellow, gray, and brown.

Representative profile of Cuthbert fine sandy loam, 12 to 35 percent slopes, eroded, in a wooded area 20 miles southeast of Batesville (SE¼NE¼ sec. 29, T. 10 S., R. 5 W.):

A_p—0 to 4 inches, brown (10YR 5/3) fine sandy loam with many, fine, faint, very dark gray (10YR 3/1) mottles; weak, fine, granular structure; very friable; many fine roots; many sandstone fragments that range in size from 5 millimeters to 70 millimeters; strongly acid; clear, wavy boundary.

A_2—4 to 7 inches, yellowish-brown (10YR 5/8) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, wavy boundary.

B_{21}—7 to 13 inches, yellowish-red (5YR 4/8) sandy clay loam with common, fine, distinct, dark-red (2.5YR 3/6) mottles; moderate, medium, angular blocky structure; friable; common fine roots; many sandstone fragments that range in size from 10 millimeters to 80 millimeters; strongly acid; clear, wavy boundary.

B_{22}—13 to 27 inches, yellowish-red (5YR 4/8) clay loam with many, medium, distinct mottles of dark red (2.5YR 3/6) and brownish yellow (10YR 6/8); moderate, medium and coarse, angular blocky structure; firm; few fine roots; clay skins on ped faces; strongly acid; gradual, wavy boundary.

C_1—27 to 32 inches, mottled, yellowish-red (5YR 4/8), dark-red (2.5YR 3/6), and brownish-yellow (10YR 6/8) clay with common, medium, prominent pockets of dark-red (10R 3/6) sand; strong, coarse, angular blocky structure; very firm; no roots; many coarse clay skins; very strongly acid; gradual, wavy boundary.

C_2—32 to 44 inches, mottled, gray or light-gray (10YR 6/1), dark red (2.5YR 3/6), yellowish-red (5YR 5/8), and reddish-yellow (7.5YR 6/8) clay; mottles are many, medium, and prominent; strong, coarse, angular blocky structure; firm; no roots; very strongly acid; abrupt, wavy boundary.

C_3—44 to 49 inches +, mottled, yellowish-red (5YR 5/8), red (2.5YR 4/8), light gray (10YR 7/1), and dark-red (2.5YR 3/6) layers of sand and clay; structureless; firm; no roots; very strongly acid.

The surface layer ranges from silt loam to loamy sand, and the subsoil, from sandy clay loam to clay. The sandstone fragments are absent in some places.

Intrazonal order

Soils in the intrazonal order have fairly well developed horizons that reflect the dominating influence of some local factor of relief or parent material over the effects of climate and vegetation. In Panola County, the intrazonal order consists of the Planosol and the Low-Humic Gley great soil groups.

PLANOSOLS

Planosols have an eluviated surface horizon. The underlying B horizon is more strongly illuviated, cemented, or compacted than is the B horizon of zonal soils. Planosols developed on nearly flat uplands under grass or forest vegetation in a humid or subhumid climate. The layer of clay or cemented material is well defined and is at a varying depth in nearly level to gently sloping areas with somewhat restricted drainage.

In this county the Planosols have a fragipan at a varying depth. The fragipan is a compact horizon that is rich in silt, sand, or both, and generally is fairly low in the content of clay. It is more developed in some soils than in others and consists of a mottled, grayish, semicompact or compact layer that restricts the movement of water. In this county the fragipan generally is silt loam.

All the Planosols in Panola County have developed in thick deposits of loess. The Calloway and Henry soils are members of this great soil group.

Calloway series.—The soils of the Calloway series are representative Planosols. They occupy slopes of 0 to 5 percent.

Profile description of Calloway silt loam, 0 to 2 percent slopes, in a pasture 5 miles east of Batesville (NE¼SE¼ sec. 19, T. 8 S., R. 6 W.):

A_p—0 to 6 inches, mottled, gray (5Y 5/1) and very dark grayish-brown (10YR 3/2) silt loam; mottles are many, fine, and distinct; weak, thick, platy structure breaking to weak, fine and coarse, granular structure; friable; common, fine concretions of manganese and iron; many fine roots; medium acid; abrupt, smooth boundary.

B_1—6 to 11 inches, yellowish-brown (10YR 5/6) silt loam with many, fine, faint, dark yellowish-brown (10YR 4/4) mottles; weak, fine, subangular blocky structure; friable; slightly sticky; common, fine, soft concretions of manganese and iron; many fine roots; much earthworm activity causes channels to be filled with soil from A_p horizon; medium acid; clear, smooth boundary

B_2—11 to 16 inches, yellowish-brown (10YR 5/6) heavy silt loam with many, fine, faint, brown or dark-brown (10YR 4/3) mottles; weak, fine, subangular blocky structure; friable when moist and slightly sticky when wet; common, fine, soft concretions of iron and manganese; many fine roots; strongly acid; abrupt, wavy boundary.

B_{3m1}—16 to 29 inches, mottled, yellowish-brown (10YR 5/6) and light olive-gray (5Y 6/2) silt loam; mottles are many, medium, and distinct; weak to moderate, medium and coarse, subangular blocky structure; compact and brittle in place, extremely hard when dry, and slightly sticky when wet; common, fine, soft concretions of manganese and iron; yellowish-red (5YR 5/6) spots around iron concretions; light olive-gray (5Y 6/2) coatings of silt in cracks and on ped faces; horizon wet and has free moisture at face of pit; many voids; few fine roots; strongly acid; gradual, wavy boundary.

B_{3m2}—29 to 39 inches, mottled, reddish yellow (7.5YR 6/6), and gray or light-gray (5Y 6/1) silt loam; mottles are many, medium, and distinct; weak, coarse, angular blocky structure; compact and brittle in place and extremely hard when dry; common, fine, soft concretions of iron and manganese; yellowish-red (5YR 5/6) spots around iron concretions; several large vertical cracks filled with light-gray (5Y 7/2) silty clay loam; many fine voids; strongly acid; gradual, wavy boundary.

B_{3m3}—39 to 50 inches, mottled, strong-brown (7.5YR 5/8), yellowish-brown (10YR 5/6), and light olive-gray (5Y 6/2) silt loam; mottles are many, medium, and prominent; weak, medium and coarse, angular blocky structure; compact and brittle in place and extremely hard when dry; few fine concretions of iron and manganese; several large, vertical cracks filled with light-gray (5Y 7/2) silty clay loam and silt loam; few fine voids; strongly acid; gradual, wavy boundary.

C—50 to 60 inches +, mottled, strong-brown (7.5YR 5/6), yellowish-brown (10YR 5/6), and light-gray (5Y 7/1) silt loam; mottles are many, medium, and prominent; structureless; friable; few concretions of iron and manganese; many medium, light-gray (5Y 7/1) coatings of silt on ped faces and in cracks; few fine voids; strongly acid.

The fragipan ranges from 12 to 20 inches in depth from the surface, but the average depth is about 16 inches. The B_2 horizon is yellowish-brown (10YR 5/6) to mottled, brown or dark brown (7.5YR 4/4), and grayish-brown (2.5Y 5/2) silt loam.

Henry series.—The soils of the Henry series are on flats or in depressions and are on slopes of 0 to 2 percent. They are poorly drained and are mottled with gray within 6 inches of the surface. A fragipan has formed at a depth of 10 to 23 inches.

The Henry soils are more poorly drained than the Calloway soils and are not so brown.

Representative profile of Henry silt loam, in a wooded area 5 miles west of Batesville (NW¼NE¼ sec. 21, T. 9 S., R. 8 W.):

A_1—0 to 2 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; friable; many fine and medium roots; strongly acid; abrupt, smooth boundary.

A_{2g}—2 to 6 inches, light brownish-gray (10YR 6/2) silt loam with few brown root stains; weak, medium, subangular blocky structure; friable; few fine concretions of manganese; many fine and medium roots; very strongly acid or strongly acid; clear, smooth boundary.

B_{2g}—6 to 23 inches, light brownish-gray (10YR 6/2) silt loam with common, fine, distinct, brown or dark-brown (10YR 4/3), and strong-brown (7.5YR 5/6) mottles; weak, medium, subangular blocky structure; friable; many fine concretions of manganese; few fine roots; strongly acid; clear, wavy boundary.

B_{3m1g}—23 to 36 inches, mottled, pale-brown (10YR 6/3) and strong-brown (7.5YR 5/6) silt loam; mottles are many, fine, and distinct; moderate, medium and coarse, subangular blocky structure; compact and brittle in place and extremely hard when dry; many fine and medium concretions of manganese; common fine voids; strongly acid; clear, wavy boundary.

B_{3m2}—36 to 45 inches +, mottled, gray or light-gray (10YR 6/1), brown or dark-brown (7.5YR 4/4), and strong-brown (7.5YR 5/6) silt loam; mottles are many, fine and medium, and distinct; moderate, coarse, subangular blocky structure; compact and brittle in place and extremely hard when dry; common medium-sized concretions of maganese; few fine voids; strongly acid.

The A horizon ranges from very dark gray (10YR 3/1) to grayish brown (10YR 5/2). The texture of the B_{2g} horizon ranges from silt loam to light silty clay loam. Depth to the fragipan ranges from 10 to 23 inches.

LOW-HUMIC GLEY SOILS

The soils in this group are poorly drained and have a very thin surface layer with moderately high organic-matter content. This layer is underlain by mottled, gray and brown, gleyed mineral horizons that vary little in texture.

The Alligator, Dowling, and Waverly soils are Low-Humic Gley soils in Panola County.

Alligator series.—The soils of the Alligator series are representative Low-Humic Gley soils. They occupy slopes of 0 to 2 percent on broad flats of bottom lands in the delta. These are fine-textured soils that have developed in Mississippi River alluvium.

Profile description of Alligator clay, 0 to ½ percent slopes, in a cultivated field 3 miles west of Curtis Station (NW¼NE¼ sec. 31, T. 8 S., R. 9 W.):

A_p—0 to 5 inches, dark-gray (10YR 4/1) clay with few, fine, distinct, dark yellowish-brown (10YR 4/4 mottles; weak, fine, granular structure; firm when dry and plastic and sticky when wet; many fine and medium roots; strongly acid; abrupt, wavy boundary.

C_{1g}—5 to 30 inches, gray (10YR 5/1) clay with common, medium, distinct, strong-brown (7.5YR 5/6) mottles; weak, fine and medium, subangular blocky structure; firm when dry and plastic and sticky when wet; few fine roots; strongly acid; clear, wavy boundary.

C_{2g}—30 to 54 inches +, gray (10YR 5/1) clay with many, medium, distinct, strong-brown (7.5YR 5/8) mottles; massive (structureless); firm when dry and very plastic and sticky when wet; no roots; strongly acid.

The A_p horizon ranges from dark gray (10YR 4/1) to gray or light gray (10YR 6/1). The C horizon is gray (10YR 5/1) to light gray (10YR 7/1) in color and silty clay or clay in texture.

Dowling series.—The soils of the Dowling series occupy depressions in the bottom lands of the delta. They have slopes of 0 to 2 percent. These are fine-textured soils that formed in Mississippi River alluvium. The Dowling soils are similar to the Alligator soils in color and drainage, but the Alligator are on broad flats instead of in depressions.

Representative profile of Dowling silty clay, in a cultivated field 3½ miles south of Crenshaw (NW¼NW¼ sec. 30, T. 7 S., R. 9 W.):

A_p—0 to 6 inches, dark-gray (10YR 4/1) silty clay with few, fine, distinct, brown or dark-brown (7.5YR 4/4) mottles; weak, fine, granular structure; firm when dry and very plastic and very sticky when wet; many fine roots; strongly acid; abrupt, smooth boundary.

C_{1g}—6 to 18 inches, gray (10YR 5/1) clay with common, medium, distinct, brown or dark-brown (7.5YR 4/4) mottles; massive (structureless); firm when dry and very sticky and very plastic when wet; few fine roots; strongly acid; clear, wavy boundary.

C_{2g}—18 to 28 inches, gray or light-gray (10YR 6/1) clay with many, medium and coarse, distinct, strong-brown (7.5YR 5/6) mottles; massive (structureless); firm when dry and very sticky and very plastic when wet; few fine concretions of manganese; no roots; strongly acid; clear, wavy boundary.

C_{3g}—28 to 47 inches +, gray or light-gray (10YR 6/1) clay with many, medium and coarse, distinct, strong brown (7.5YR 5/6) and brown or dark-brown (7.5YR 4/4) mottles; massive (structureless); firm when dry and very plastic and very sticky when wet; no roots; strongly acid.

The A_p horizon ranges from very dark gray (10YR 3/1) to gray or light gray (10YR 6/1) in color and from silty clay loam to clay in texture. The matrix of the C_g horizon ranges from gray (10YR 5/1)) to light gray (10YR 7/1).

Waverly series.—The soils of this series are in recent loessal alluvium on bottom lands. They are poorly drained and are mottled with gray below a depth of 6 inches.

Representative profile of Waverly silt loam, in a wooded area 4 miles southwest of Pope, 460 feet south and 300 feet west of the northeastern corner, sec. 33, T. 27 N., R. 3 E., on the Old Choctaw-Chickasaw Boundary:

A_1—0 to 7 inches, dark-gray (10YR 4/1) silt loam with common, fine, distinct, gray or light-gray (10YR 6/1) mottles; structureless; friable; many fine and few medium and coarse roots; much charcoal and decayed roots; strongly acid; clear, wavy boundary.

C_{1g}—7 to 14 inches, gray or light-gray (10YR 6/1) silt loam with common, fine and medium, distinct, strong-brown (7.5YR 5/6) mottles; structureless; friable; few fine concretions of iron; few fine and coarse roots; strongly acid; clear, wavy boundary.

C_{2g}—14 to 27 inches, gray or light-gray (10YR 6/1) heavy silt loam with common, fine and medium, distinct, strong-brown (7.5YR 5/6) mottles; structureless; friable; few fine concretions of iron and manganese; few fine roots; strongly acid; clear, wavy boundary.

C_{3g}—27 to 37 inches, light brownish-gray (10YR 6/2) silt loam with many, fine, distinct, strong brown (7.5YR 5/6) mottles; structureless; slightly sticky; many fine and medium concretions of manganese and iron and a few coarse concretions of manganese; strongly acid; clear, wavy boundary.

C_{4g}—37 to 57 inches, gray (10YR 5/1) silt loam with many, fine, distinct, yellowish-brown (10YR 5/8) mottles and few, coarse, distinct, strong-brown (7.5YR 5/6) mottles; structureless; slightly sticky; few fine concretions of manganese and iron; strongly acid; clear, wavy boundary.

C_{5g}—57 to 75 inches +, mottled, gray or light-gray (10YR 6/1), light-gray (2.5Y 7/2), and pale-brown (10YR 6/3) silt loam with common, fine to coarse, distinct, yellowish-brown (10YR 5/8) mottles; structureless, but thinly stratified; slightly sticky; few fine concretions of manganese and iron; strongly acid.

The C horizon ranges from silt loam to silty clay loam.

Azonal order

Soils in the azonal order have a weakly developed profile because they are young or because resistant parent material or relief prevents the development of characteristics that are typical of zonal soils.

In Panola County the azonal order consists of the Regosols and the Alluvial soils.

REGOSOLS

Regosols consist of deep, unconsolidated rock or soft mineral deposits in which few or no clearly expressed soil characteristics have developed. In Panola County Regosols generally formed on steep slopes in gravelly and sandy Coastal Plain material. The Guin and Eustis soils are Regosols in Panola County.

Guin series.—The soils of the Guin series are representative Regosols. They formed in sandy and gravelly Coastal Plain material on slopes of 17 to 40 percent. These soils are acid, excessively drained, and structureless.

Profile description of Guin gravelly silt loam, 17 to 40 percent slopes, eroded, in a wooded area half a mile northeast of Askew (NE¼NE¼ sec. 30, T. 6 S., R. 9 W.):

A_p—0 to 5 inches, brown or dark-brown (10YR 4/3) gravelly silt loam; 60 percent of horizon is gravel; many pebbles 3 to 50 millmeters in size; weak, fine, granular structure; friable; few worm casts; many roots; medium acid; clear, wavy boundary.

C_1—5 to 30 inches, mottled, dark-red (2.5YR 3/6), yellowish-red (5YR 4/6), pale-yellow (2.5YR 8/4), and dark reddish-brown (5YR 3/4) gravelly sandy loam; mottles are many, medium, and prominent; 80 percent of horizon is gravel; many pebbles 3 to 75 millimeters in size; structureless; loose; few fine roots; medium acid; clear, wavy boundary.

C_2—30 to 50 inches, +, mottled, dark reddish-brown (5YR 3/4), pale-yellow (2.5YR 8/4), and strong-brown (7.5YR 5/6) gravelly fine sandy loam; mottles are many, medium, and prominent; 35 percent of horizon is gravel; many pebbles 3 to 35 millimeters in size; structureless; loose; no roots; medium acid.

The profile of this soil is not uniform. Pebbles and cobbles extend from 3 feet to as much as 60 feet and are 3 to 110 millimeters in size. The surface soil ranges from gravelly sandy loam to loamy sand that is free of gravel. The C horizon is colored many shades of brown, red, yellow, and gray and is always gravelly.

Eustis series.—The soils of the Eustis series formed in sandy Coastal Plain material on slopes of 12 to 35 percent. They are predominantly strong-brown (7.5YR 5/6) loamy sand that is acid, excessively drained, and structureless.

Representative profile of Eustis sandy loam, 17 to 35 percent slopes, eroded, in an idle field 13 miles east of Batesville (SW¼NE¼ sec. 33, T. 8 S., R. 5 W.):

A_p—0 to 5 inches, mottled, brown or dark brown (10YR 4/3), light yellowish-brown (10YR 6/4), and brown (10YR 5/3) sandy loam; mottles are many, fine, and faint; structureless; loose; many fine roots; strongly acid; clear, wavy boundary.

A_3—5 to 9 inches, strong-brown (7.5YR 5/6) loamy sand; structureless; loose; many fine roots; strongly acid; clear, wavy boundary.

C_1—9 to 43 inches, strong-brown (7.5YR 5/6) loamy sand; structureless; loose; few fine roots; very strongly acid; abrupt, wavy boundary.

D—43 to 55 inches +, red (2.5YR 4/8) sandy clay loam; weak, fine, subangular blocky structure; friable; very strongly acid.

The depth to the D horizon in this soil ranges from 30 to 65 inches. The D horizon has about the same color, texture, and structure as the lower part of the B horizon in the Ruston soils but is more strongly acid.

ALLUVIAL SOILS

The Alluvial soils occur in transported material of fairly recent deposition. Horizonation is weak or lacking

in these soils because the soil-forming processes have not had enough time to develop a well-developed profile.

Members of the Alluvial great soil group in Panola County are the Collins and Falaya soils.

Collins series.—The soils of the Collins series are representative Alluvial soils. They are in recent loessal alluvium on nearly level bottom lands and are moderately well drained.

Profile description of Collins silt loam (0 to 2 percent slopes) in a cultivated field 3 miles east of Como (NW¼ NE¼ sec. 1, T. 7 S., R. 7 W.):

A_p—0 to 6 inches, brown or dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; many fine and medium roots; strongly acid or medium acid; clear, wavy boundary.

C_1—6 to 24 inches, brown or dark-brown (10YR 4/3) to dark yellowish-brown (10YR 4/4) silt loam with few, fine, faint, light yellowish-brown (10YR 6/4) mottles; structureless; friable; common fine roots; strongly acid or medium acid; clear, wavy boundary.

C_2—24 to 48 inches +, yellowish-brown (10YR 5/4) silt loam with many, fine, faint and distinct, dark yellowish-brown (10YR 4/4), light-gray (10YR 7/2), and very pale brown (10YR 7/3) mottles; structureless; friable; few fine, soft, brown concretions; few fine roots; strongly acid.

The A_p horizon ranges from brown or dark brown (10YR 4/3) to brown (10YR 5/3). The depth to the gray mottles is 18 to 30 inches.

Falaya series.—The soils of the Falaya series are in recent loessal alluvium on nearly level bottom lands. These soils are not so well drained as the Collins soils and are mottled more distinctly and at less depth. The Falaya soils in this county intergrade toward the Low-Humic Gley great soil group.

Representative profile of Falaya silt loam, in a cultivated field 9 miles west of Batesville (NE¼NW¼ sec. 23, T. 9 S., R. 9 W.):

A_p—0 to 7 inches, brown (10YR 5/3) silt loam; weak, fine and medium, granular structure; friable; many fine and few medium roots; strongly acid; abrupt, smooth boundary.

C_1—7 to 12 inches, mottled, brown (10YR 5/3), and light brownish gray (10YR 6/2) silt loam; mottles are many, medium, and distinct; structureless; friable; common fine roots; strongly acid; clear, smooth boundary.

C_{2g}—12 to 26 inches, light-gray (10YR 7/1) silt loam with many, medium, faint, very pale brown (10YR 7/4) mottles and few, fine, distinct, strong-brown (7.5YR 5/6) mottles; structureless; friable; common fine roots; very strongly acid; clear, wavy boundary.

C_{3g}—26 to 43 inches +, gray or light-gray (10YR 6/1) and light-gray (10YR 7/2) silt loam with common, fine, distinct, strong-brown (7.5YR 5/6) mottles; structureless; friable; few fine roots; strongly acid.

The A_p horizon ranges from dark grayish brown (10YR 4/2) to brown (10YR 5/3). Gray mottles begin at a depth of 6 to 18 inches. The C horizon ranges from silt loam to silty clay loam.

Additional Facts About the County

This section is written primarily for those who are not familiar with Panola County. It discusses history and population, climate, water supply, agriculture, and other subjects of general interest.

History and Population

Panola County was established in 1836 after the land was ceded in 1832 by the Chickasaw Indians. The size of the county was reduced in 1877, when 60 square miles was given to newly formed Quitman County. Panola County now has a total land area of 685 square miles.

The county was named Panola for the Indian word meaning cotton. It has two county seats, Batesville and Sardis. Batesville was originally named Panola. In the 1840's it was along the Little Tallahatchie River and flourished as a cotton shipping port. Later, a railroad was built south of the river and the town was relocated along the railroad. Many of the houses were moved from the old site to the present location. Batesville was named for J. W. Bates, a minister.

Sardis, the other county seat, was originally named Belmont. Like Batesville, this town was first along the Little Tallahatchie River and was later moved close to the railroad. The town's first postmaster renamed the town Sardis for one of the churches mentioned in the Bible (*8*).

In 1960, Panola County had a population of 28,791, which is 7.9 percent less than its population in 1950. The population of Batesville, however, increased 33.3 percent from 1950 to 1960, or from 2,463 to 3,284. In the same period Sardis increased 9.7 percent in population, or from 1,913 to 2,098. Other towns in the county are Como, Crenshaw, Crowder, Pope, and Courtland. Smaller communities are Askew, Buxton, Longtown, Pleasant Grove, Curtis Station, and Tocowa.

Climate

Panola County is hot and humid in summer and is mild and humid in winter. Weather bureau records of the Batesville station are summarized in table 11. The temperature reaches 90° F., or higher on 60 to 65 days a year, but at this temperature, the relative humidity never exceeds 80 percent. Humidity is between 50 and 80 percent for 30 percent of the time that temperature is 90° or higher. In winter the relative humidity is between 50 and 79 percent for 52 percent of the time that the temperature is below 50°. From November through April, a temperature below 50° occurs 42 percent of the time.

In winter the temperature averages 55° in the daytime and 35° at night. The average temperature in daytime is 65° in mid-March, 75° in mid April, and 90° in mid-June. This average remains 90° until early in September. At night the average temperature is 50° in mid-April, 60° at the end of May, and 70° in mid-July. This average remains at 70° until early in September. During the latter part of September and the early part of October, temperature drops sharply to an average low of 50° and an average high of 78°.

Freezing temperature generally lasts for only 1 to 3 days, but at least once a year the temperature drops to 20°. The top of the ground is sometimes frozen but generally thaws rapidly. In table 12 are listed the chances of damaging temperature after a given date in spring and before a given date in fall. The chances for temperatures of 36° and 40° are included in table 12 because seeds in beds and young plants can be damaged when weather is clear and calm and these temperatures are recorded by a thermometer that is 5 feet above ground and

is in a shelter. Such a thermometer recorded the temperatures that were used in computing the data in table 12.

TABLE 11.—*Temperature and precipitation at Batesville, Panola County, Mississippi*
[Elevation, 230 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1918)	Wettest year (1932)	Average snowfall
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
January	43.4	80	-7	4.89	4.85	12.83	1.2
February	45.4	84	-16	4.28	2.65	8.34	.9
March	53.6	92	12	5.60	.30	3.95	.1
April	62.3	95	26	5.04	8.15	5.14	(3)
May	70.3	99	35	4.72	.82	2.20	(3)
June	78.1	106	45	3.98	1.49	4.29	0
July	80.6	108	47	3.75	1.04	7.37	0
August	79.9	107	48	3.65	3.44	2.77	0
September	74.5	108	32	3.11	2.49	7.92	0
October	61.5	97	23	2.67	2.41	3.16	0
November	51.0	88	8	4.09	1.80	3.60	.2
December	43.9	82	1	5.73	2.94	9.73	.6
Year	62.0	108	-16	51.51	32.38	71.30	3.0

[1] Average temperature based on a 68-year record, through 1955; highest and lowest temperatures based on a 61-year record, through 1952.
[2] Average precipitation based on a 70-year record, through 1955; wettest and driest years based on a 66-year record, in the period 1888–1955; snowfall based on a 61-year record, through 1952.
[3] Trace.

Winter and spring are slightly wetter than summer and fall. October, the driest month, is generally the most pleasant month of the year because days are warm but not hot, sunshine is plentiful, and nights are cool. October is also the best month for harvesting. In winter and spring the precipitation often comes as prolonged rains. Generally, this rain is caused when warm air from the Gulf of Mexico overruns a low mass of cold air. Sometimes an active, prolonged low-pressure area forms in the Gulf and causes rain in Panola County. Such prolonged low-pressure areas have occurred in the Gulf every winter from 1958 to 1961. Precipitation in summer and early in fall is in thundershowers that are generally widely scattered. Some local areas do not get these showers for many days and may be droughty. Once in about 10 years, drought is widespread.

In the 63 years for which records are available, measurable amounts of snow or sleet have fallen in 42 winters, or in about two out of three winters. Generally, snow falls only once a year, but in one out of five winters, it falls in two or more months. The heaviest snow recorded was 10 inches in January 1935.

Physiography

Panola County consists of three areas that extend from north to south across the county. From west to east these areas are the Mississippi River alluvial plain, a wide belt of deep loess, and a part of the Coastal Plain.

In Panola County the Mississippi River alluvial plain is 1/4 mile to 8 miles wide. Some soils on the plain are silty, and some are clayey. The silty soils formed in two kinds of alluvium, that brought in by streams from distant loessal uplands, and that washed down from nearby uplands. The clayey soils are in slack-water areas and formed in alluvium from the Mississippi River. This alluvium is probably 200 feet thick in places.

The loessal area in the central part of the county is 10 to 26 miles wide. The soils in this area formed in a mantle of loess that is underlain by Coastal Plain material. The mantle ranges from 4 to about 50 feet in thickness. It is thickest at the western edge of the area and is progressively thinner toward the east.

The loess in the central part of the county was probably deposited during the ice age after melting glaciers created a river much larger than the present Mississippi River. The glacial river deposited rock flour and other finely ground rock along its sides as it flowed toward the Gulf of Mexico. After the flow of water lessened and the river receded, the sediments dried and were exposed to wind in winter. The prevailing southwesterly wind blew the fine material to the hills and valleys, where it was deposited along the eastern rim of the valley. Much of this area is gullied because erosion is severe where the land has been cleared and left unprotected in recent years.

The Coastal Plain area is 1 1/2 to 9 miles wide and extends along the Lafayette County line. The soils in this area formed mostly in unconsolidated material that was laid down by seas during the Pliocene epoch. After the seas receded, this material was covered by a thin mantle of loess. Loess less than 4 feet thick still covers the ridges in the eastern part of the county and is underlain by sandy Coastal Plain material. But geologic erosion has removed the loess from the side slopes and has left only the Coastal Plain material. Thus, the soils on ridges formed in loess, and the soils on slopes formed in Coastal Plain material.

TABLE 12.—*Chance of last damaging temperature in spring and first in fall*

Chance[1]	Temperature in spring of—						Temperature in fall of—					
	20° F. after—	24° F. after—	28° F. after—	32° F. after—	36° F. after—	40° F. after—	20° F. before—	24° F. before—	28° F. before—	32° F. before—	36° F. before—	40° F. before—
1 in 10	Feb. 26	Mar. 18	Apr. 4	Apr. 22	May 4	May 13	Nov. 18	Oct. 27	Oct. 22	Oct. 11	Oct. 2	Sept. 22
2 in 10	Feb. 19	Mar. 11	Mar. 28	Apr. 15	Apr. 27	May 6	Nov. 26	Nov. 3	Oct. 28	Oct. 17	Oct. 8	Sept. 28
5 in 10	Feb. 3	Feb. 25	Mar. 14	Apr. 1	Apr. 13	Apr. 22	Dec. 11	Nov. 18	Nov. 8	Oct. 28	Oct. 19	Oct. 9

[1] Chance of a temperature as low as that listed on or after date in spring and on or before date in fall.

Water Supply

Water for domestic use flows from springs or from shallow wells that are dug or bored. The water in most of these wells is from Citronelle sand and gravel. On the delta, abundant water is obtained in shallow, bored or drilled wells that penetrate the underlying alluvium. Water is also abundant in the central part of the county. It comes from the alluvium that underlies the flood plains of the Tallahatchie and Yocona Rivers and their tributaries. In the eastern part of the county, the wells range from shallow to deep, and the water is from Kosciusko and Tallahatta sands (*8*).

Public Facilities

Panola County has eight high schools and many elementary schools. County-owned buses transport the students from all parts of the county to these schools. Students from Panola County also attend Northwest Mississippi Junior College, which is nearby at Senatobia in Tate County.

Batesville, Sardis, Como, and Crenshaw have small public libraries, and a mobile library serves the other communities. A weekly newspaper is published at Batesville and another at Sardis.

Churches of many denominations are in the county. Medical care is available at a hospital and a clinic in Batesville, at two clinics in Sardis, and at one clinic in Como.

Playgrounds are maintained by the public schools and, in summer, have supervised programs for Little League baseball and other activities.

Industries and Transportation

A number of plants in Panola County process cotton and other agricultural products, and a few plants manufacture a variety of articles. Twenty-two cotton gins are scattered through the county. Cottonseed oil and linters are produced. Some plants make hosiery, cotton compresses, concrete blocks and tile, luggage, and other products. Athletic equipment is repaired in several plants.

Electricity, oil, and gas are supplied to all parts of the county. Pipelines for the gas extend across the county from southwest to northeast, and there is a booster station south of State Route 6, about 6 miles west of Batesville. A high-pressure pipeline for oil has been laid across the southeastern corner of the county, and an underground communications cable extends north and south, paralleling U.S. Highway No. 51.

The main line of the Illinois Central Railroad runs from north to south and almost bisects Panola County. A freight line extends from the main line 7 miles in the northwestern corner of the county. It runs north and south close to State Route 3.

Many roads cross the county. U.S. Highway No. 51 runs north and south through almost the center and is paralleled by National Interstate Highway No. 55, soon to be completed. State Route 6 runs east and west in the south-central part of the county, and State Route 3 runs north and south in the northwestern part. These State roads are concrete. Blacktopping has been started on other State routes. The many gravel roads in the county are also being improved. Buses and trucks run on U.S. Highway No. 51 and State Routes 6 and 3.

Agriculture

Little is known about the agriculture of Panola County in its early days. Although the Indians grew corn, they obtained most of their food by hunting. The early white settlers grew corn, peas, beans, potatoes, and other crops for their own use.

Cotton was grown extensively in the early 1800's. As early as 1840, large amounts of cotton were shipped from ports on the Little Tallahatchie River. The cotton was shipped to New Orleans at a cost of two dollars a bale and to Memphis for fifty cents a bale. In 1909, 87,691 acres of cotton was harvested in the county. In some years between 1909 and 1959, more than 100,000 acres of cotton was harvested, but the acreage in cotton has declined since early in the 1930's, when the government restricted the acreage that could be planted to cotton. In 1959, only about 37,000 acres was harvested.

Agriculture has recently been diversified in Panola County. Of increasing importance are livestock, soybeans, peach and pecan orchards, and strawberries, okra, and other truck crops.

Livestock and livestock products

More beef cattle are raised in Panola County than in most other counties in the State. Among its cattle are many fine registered bulls and cows. Table 13 lists the number of livestock in the county in 1954 and 1959. In the past 60 years, the number of cattle in the county increased 140.6 percent, or from 18,860 in 1900 to 45,386 in 1959. Hogs and pigs increased 31.5 percent from 1954 to 1959. The cattle and hogs are marketed in Batesville, Como, Senatobia, Grenada, and Oxford, Miss., and Memphis, Tenn.

Milk is collected from farms in all parts of the county and is taken to dairies for processing. Nine dairies produce Grade A milk, which is shipped to Memphis, Tenn., and Oxford, Miss., and 26 dairies ship manufactured (Grade C) milk to Winona, Miss.

Most of the poultry is sold at Tupelo and Greenwood, Miss., and at Memphis, Tenn. Between 1954 and 1959, the number of chickens increased about 39 percent.

According to the 1959 Census of Agriculture, the value of all livestock and livestock products sold in the county increased from $1,113,351 in 1954 to $3,285,060 in 1959, or 195 percent.

TABLE 13.—*Number of livestock on farms*

Livestock	1954	1959
Cattle and calves	47, 164	45, 386
Milk cows	5, 815	3, 444
Horses and mules	5, 341	3, 580
Hogs and pigs	11, 483	15, 097
Sheep and lambs	955	749
Chickens (4 months old and over)	75, 919	105, 484
Turkey hens kept for breeding	332	335

Crops

Table 14 lists the acreage of important crops in the county in 1954 and 1959. Though the acreage in soybeans almost doubled between 1954 and 1959, the acreage in cotton, corn, and oats decreased. The acreage in hay increased slightly. Most of the land taken out of cultivation is in pasture.

TABLE 14.—*Acreage of the principal crops*

Crop	1954	1959
	Acres	*Acres*
Cotton harvested	46, 178	36, 703
Soybeans grown for all purposes	14, 561	28, 814
Corn for all purposes	34, 988	22, 013
Hay crops [1]	10, 622	11, 559
Oats harvested	5, 567	2, 323

[1] Figures do not include sorghum, soybean, cowpea, and peanut hay.

Number, size, and tenure of farms

According to the 1959 Census of Agriculture, the number of farms in Panola County decreased from 4,457 in 1954 to 3,176 in 1959, a decrease of 1,281 farms. The smaller number reflects the trend of farms increasing in size, although a change in the system of reporting is responsible for 6.9 percent of the decrease. The average size of the farms in the county increased from 84.2 acres in 1954 to 118 acres in 1959.

The 1959 census classifies farms in this county by size as follows: under 10 acres, 360 farms; 10 to 49 acres, 1,548 farms; 50 to 69 acres, 163 farms; 70 to 99 acres, 278 farms; 100 to 139 acres, 184 farms; 140 to 179 acres, 163 farms; 180 to 219 acres, 77 farms; 220 to 259 acres, 66 farms; 260 to 499 acres, 192 farms; 500 to 999 acres, 94 farms; and 1,000 or more acres, 51 farms.

In 1959, owners operated about 32 percent of the farms, part owners operated 12 percent, and tenants operated 55 percent. Managers operated less than 1 percent of the farms.

Land use

In 1959, 374,614 acres, or 85.5 percent of the total area of the county, was in farms. The harvested cropland decreased from 116,118 acres in 1954 to 105,724 acres in 1959. Woodland decreased from 97,621 acres to 86,964 acres in the same period, and pasture that is not cropland and not woodland increased from 72,012 acres to 89,671 acres.

The smooth, productive land is used for crops, and the steep or wet land is in trees and grass. Recently, many steep, eroded areas have been taken out of crops and put in trees. Because the acreage allotments for cotton have been reduced by the government, many farmers are raising livestock for their cash income instead of cotton. This change improves the soil because pastures are established and close-growing crops are grown.

Types of farms

Although the number of cotton farms has decreased, cotton is still the dominant cash crop in Panola County. But farming has become more diversified in recent years. Between 1954 and 1959, beef and dairy farms increased in number, as have other kinds of farms except general and cash grain. Following is the number of farms in the county in 1959, listed by type:

Type of farm	*Number*
Cotton	1, 944
Miscellaneous and unclassified	805
Livestock (other than poultry and dairy)	288
General	46
Cash-grain	34
Dairy	27
Poultry	15
Fruit-and-nut	10
Other field-crop	7

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Glossary

Alluvium. Fine material, such as sand, silt, or clay, that has been deposited on land by streams.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. The terms used to describe consistence in this report are—

Brittle. When dry, soil that is struck a sharp blow breaks with a clean fracture or shatters to cleanly broken, hard fragments.

Compact. When moist, soil has dense and firm arrangement of particles, which are not cemented.

Firm. When moist, soil crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Friable. When moist, soil crushes easily under gentle to moderate pressure between the thumb and forefinger and can be pressed together into a lump.

Plastic. When wet, soil is readily deformed by moderate pressure but can be pressed into a lump; forms a wire when rolled between thumb and forefinger.

Sticky. When wet, soil adheres to other material; tends to stretch somewhat and pull apart, rather than pull free from other material.

Eluviation. The movement of material from one place to another within the soil, in either true solution or colloidal suspension. Soil horizons that have lost material through eluviation are said to be eluvial; those that have received material are illuvial.

First bottom. The normal flood plain of a stream; subject to frequent or occasional flooding.

Fragipan. A dense, brittle, subsurface horizon very low in organic matter and clay but rich in silt or very fine sand. The layer seems to be cemented when it is dry, is hard or very hard, and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Gley soil. A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons with yellow and gray mottling caused by intermittent waterlogging.

Great soil group. A broad group of soils that have fundamental characteristics in common. The great soil groups in Panola County are Gray-Brown Podzolic soils, Red-Yellow Podzolic soils, Low-Humic Gley soils, Planosols, Alluvial soils, and Regosols.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. The relative position of the several soil horizons in a typical soil profile, and their nomenclature, are as follows:

A_0—Organic debris, partly decomposed or matted.

A_1—A dark-colored horizon having a fairly high content of organic matter mixed with mineral matter.

A_2—A light-colored horizon, often representing the zone of maximum leaching where podzolized; absent in wet, dark colored soils

A_3—Transitional to B horizon but more like A than B; sometimes absent.

B_1—Transitional to B horizon but more like B than A; sometimes absent.

B_2—A usually darker colored horizon, which often represents the zone of maximum illuviation where podzolized.

B_3—Transitional to C horizon.

C—Slightly weathered parent material; absent in some soils.

D—Underlying substratum.

The A horizons make up a zone of eluviation, or leached zone. The B horizons make up a zone of illuviation, in which clay and other materials have accumulated. The A and B horizons, taken together, are called the solum, or true soil.

Illuviation. The accumulation of material in a soil horizon through the deposition of suspended material and organic matter removed from horizons above. Since part of the fine clay in the B horizon (or subsoil) of many soils has moved into the B horizon from the A horizon above, the B horizon is called an illuvial horizon.

Internal soil drainage. The downward movement of water through the soil profile. The rate of movement is determined by the texture, structure, and other characteristics of the soil profile and underlying layers, and by the height of the water table, either permanent or perched. Relative terms for expressing internal drainage are *none, very slow, slow, medium, rapid,* and *very rapid.*

Leaching. The removal of soluble materials from soils or other material by percolating water.

Loess. A fine-grained eolian deposit consisting dominantly of silt-sized particles.

Morphology, soil. The makeup of the soil, including the texture, structure, consistence, color, and other physical, chemical, mineralogical, and biological properties of the various horizons that make up the soil profile.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Natural drainage. Refers to moisture conditions that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural drainage are recognized.

Excessively drained. Soils that are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained. Soils that are also very permeable and are free from mottling througout their profile.

Well drained. Soils that are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained. Soils that commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and C horizons.

Poorly drained. Soils that are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained. Soils that are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Parent material (soil). The horizon of weathered rock or partly weathered soil material from which soil has formed; horizon C in the soil profile.

Permeability, soil. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are as follows. *Very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Phase, soil. A subdivision of a soil type, series, or other unit in the soil classification system made because of differences in the soil that affect its management but do not affect its classification in the natural landscape. A soil type, for example, may be divided into phases because of differences in slope, stoniness, thickness, or some other characteristic that affects management.

Podzolization. The process by which a soil is depleted of bases, becomes more acid, and develops a leached surface layer.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material. See Horizon, soil.

Reaction, soil. The degree of acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction, because it is neither acid nor alkaline. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Relief. The elevation or inequalities of a land surface, considered collectively.

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Series, soil. A group of soils developed from a particular type of parent material and having genetic horizons that, except for texture of the surface soil, are similar in differentiating characteristics and in arrangement in the profile.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants. Soil has properties resulting from the integrated effect of climate and living matter acting upon parent material, as conditioned by relief over periods of time.

Solum (pl. sola). The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying parent material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are *platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are (1) *single grain* (each grain by itself, as in dune sand) or (2) *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the profile below plow depth.

Substratum. Any layer lying beneath the solum, or true soil; the C or D horizon.

Surface runoff. The water that flows off the land surface without sinking in.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. (See also clay, sand, and silt.) The basic textural classes, in order of increasing proportions of fine particles are as follows: Sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Type, soil. A subdivision of the soil series that is made on the basis of differences in the texture of the surface layer.

Undifferentiated soil group (mapping unit). Two or more soils or land types that are mapped as one unit because their differences are not significant to the purpose of the survey or to soil management.

Upland (geology). Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowlands along rivers.

Water-disposal system. System that protects soils from erosion, or drains excess water from the soils, or both. Soils susceptible to erosion can be protected by constructing vegetative waterways, by terracing, and by arranging rows on the contour. Excess water in the soil can be drained by appropriately arranged rows, by V- and W-shaped ditches, and by secondary ditches. Both erodible soils and wet soils may require diversions to protect them from runoff from higher soils.

GUIDE TO MAPPING UNITS

Map symbol	Soil	Page	Capability unit Symbol	Capability unit Page	Woodland suitability group Number	Woodland suitability group Page
Aa	Alligator clay, 0 to ½ percent slopes	5	14(A8-IIIw 11)	20	1	44
Ab	Alligator clay, ½ to 2 percent slopes	5	14(A8-IIIw-11)	20	1	44
Ac	Alligator silt loam, overwash, ½ to 2 percent slopes	5	13(A8 IIIw-7)	20	1	44
Ad	Alligator silty clay loam, 0 to ½ percent slopes	5	12(A8-IIIw-5)	19	1	44
Ae	Alligator silty clay loam, ½ to 2 percent slopes	5	12(A8-IIIw-5)	19	1	44
CaA	Calloway silt loam, 0 to 2 percent slopes	5	11(A7 IIIw-4)	19	7	46
CaB	Calloway silt loam, 2 to 5 percent slopes	6	11(A7-IIIw-4)	19	7	46
Cm	Collins silt loam	6	3(A7-IIw 1)	16	6	46
Co	Collins silt loam, local alluvium	6	3(A7-IIw 1)	16	6	46
CpF2	Cuthbert and Providence soils, 12 to 35 percent slopes, eroded	6	29(A3-VIIe 4)	23	3	45
Do	Dowling silty clay and clay	7	21(A8-Vw 1)	22	2	45
Fa	Falaya silt loam	7	9(A7-IIIw 1)	18	5	45
Fl	Falaya silt loam, local alluvium	7	9(A7 IIIw-1)	18	5	45
Fs	Falaya silty clay loam	7	10(A7 IIIw-2)	18	5	45
Fw	Falaya and Waverly silt loams	7	19(A7-IVw-1)	21	5	45
GrA	Grenada silt loam, 0 to 2 percent slopes	8	4(A7 IIs-1)	16	7	46
GrB	Grenada silt loam, 2 to 5 percent slopes	8	2(A7 IIe-5)	15	7	46
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded	8	2(A7-IIe-5)	15	7	46
GrB3	Grenada silt loam, 2 to 5 percent slopes, severely eroded	8	8 (A7-IIIe-7)	18	7	46
GrC2	Grenada silt loam, 5 to 8 percent slopes, eroded	8	7 (A7-IIIe-4)	18	7	46
GrC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded	8	17 (A7-IVe-5)	21	7	46
GrD2	Grenada silt loam, 8 to 12 percent slopes, eroded	9	18 (A7-IVe-6)	21	7	46
GrD3	Grenada silt loam, 8 to 12 percent slopes, severely eroded	9	24 (A7-VIe-4)	22	7	46
Gs	Gullied land, sandy	9	27 (A7-VIIe-2)	23	4	45
Gu	Gullied land, silty	9	27 (A7-VIIe-2)	23	4	45
He	Henry silt loam	9	20 (A7-IVw-2)	21	8	46
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded	10	1 (A7-IIe-1)	15	9	46
LoB3	Loring silt loam, 2 to 5 percent slopes, severely eroded	10	5 (A7-IIIe-1)	17	9	46
LoC	Loring silt loam, 5 to 8 percent slopes	10	6 (A7-IIIe-2)	17	9	46
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded	10	6 (A7-IIIe-2)	17	9	46
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded	10	5 (A7-IIIe-1)	17	9	46
LoD	Loring silt loam, 8 to 12 percent slopes	10	16 (A7-IVe-2)	20	9	46
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded	10	16 (A7-IVe-2)	20	9	46
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded	10	15 (A7-IVe-1)	20	9	46
LoE2	Loring silt loam, 12 to 17 percent slopes, eroded	10	22 (A7-VIe-1)	22	9	46
LoE3	Loring silt loam, 12 to 17 percent slopes, severely eroded	10	22 (A7-VIe-1)	22	9	46
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded	11	1 (A7-IIe-1)	15	9	46
MeB3	Memphis silt loam, 2 to 5 percent slopes, severely eroded	11	5 (A7-IIIe-1)	17	9	46
MeC3	Memphis silt loam, 5 to 8 percent slopes, severely eroded	11	5 (A7-IIIe-1)	17	9	46
MlF2	Memphis and Loring silt loams, 17 to 35 percent slopes, eroded	11	25 (A7-VIIe-1)	23	9	46
MlF3	Memphis and Loring silt loams, 17 to 35 percent slopes, severely eroded	11	25 (A7-VIIe-1)	23	9	46
MnF2	Memphis, Natchez, and Guin soils, 17 to 40 percent slopes, eroded	11	28 (A7-VIIe-4)	23	9	46
Mx	Mixed alluvial land	12	None	------	6	----
RpE2	Ruston, Providence, and Eustis soils, 12 to 17 percent slopes, eroded	13	23 (A3-VIe-1)	22	3	45
RpF2	Ruston, Providence, and Eustis soils, 17 to 35 percent slopes, eroded	12	26 (A3-VIIe-1)	23	3	45
Wa	Waverly silt loam	13	19 (A7-IVw-1)	21	10	45

○

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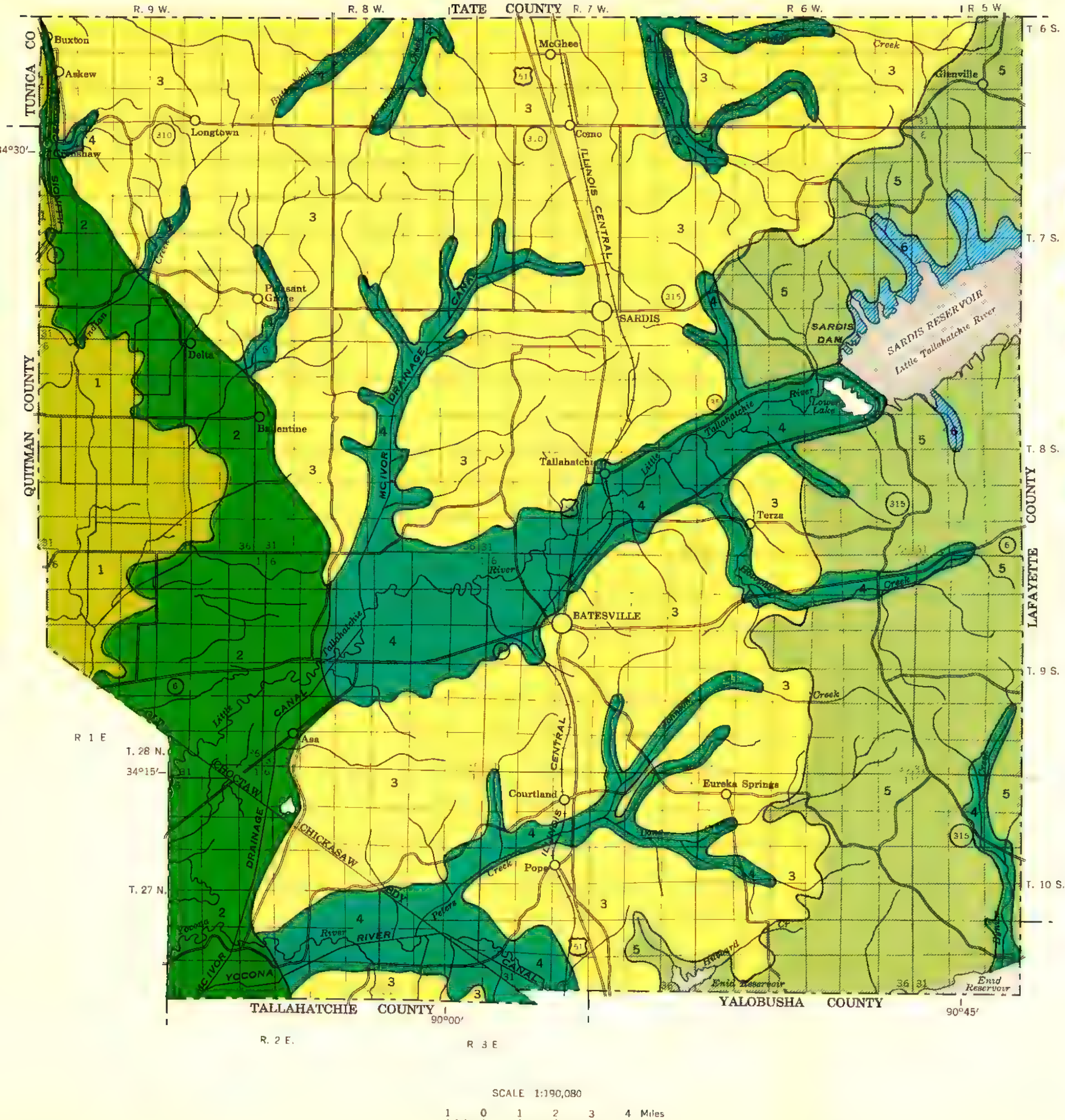
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
MISSISSIPPI AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP
PANOLA COUNTY, MISSISSIPPI



SOIL ASSOCIATIONS

1 Alligator-Dowling association: Poorly drained soils of broad flats and narrow depressions on flood plains.

2 Falaya-Waverly-Collins association: Moderately well drained to poorly drained, silty soils of flats and depressions on flood plains.

3 Loring-Grenada-Memphis association: Well drained and moderately well drained, gently sloping to very steep soils in thick loess.

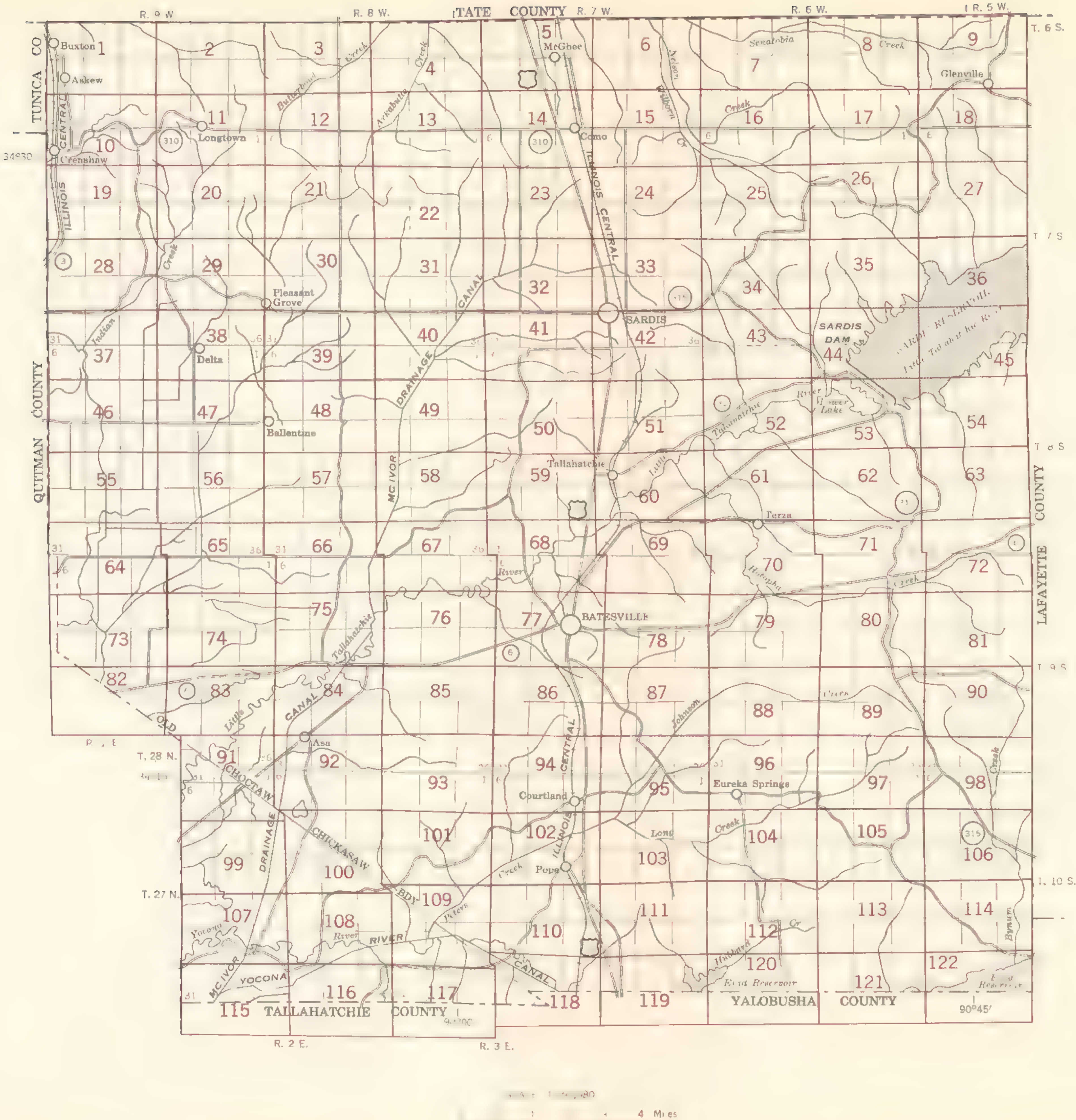
4 Collins-Falaya-Grenada-Calloway association: Somewhat poorly drained and moderately well drained, silty soils in alluvium on nearly level flood plains and benches, or in thick loess on nearly level to moderately sloping uplands.

5 Ruston-Providence-Eustis association: Excessively drained, steep or very steep soils in sandy Coastal Plain sediments on side slopes, and moderately well drained soils in thin loess on ridges.

6 Mixed alluvial land-Falaya-Waverly association: Somewhat poorly drained or poorly drained, stratified, silty and sandy soils, or silty soils, on flood plains.

March 1963

INDEX TO MAP SHEETS
PANOLA COUNTY, MISSISSIPPI



U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

PANOLA COUNTY, MISSISSIPPI

MISSISSIPPI AGRICULTURAL EXPERIMENT STATION

SOIL LEGEND

The first capital letter is the initial one of the soil name. A second capital letter, A, B, C, D, E, and F, shows the slope. Symbols without a slope letter are those of nearly level soils or land types, but some have considerable range in slope. A final number, 2 or 3, in the symbol shows that the soil is eroded, or severely eroded.

SYMBOL	NAME
Aa	Alligator clay, 0 to 1/2 percent slopes
Ab	Alligator clay, 1/2 to 2 percent slopes
Ac	Alligator silt loam, overwash, 1/2 to 2 percent slopes
Ad	Alligator silty clay loam, 0 to 1/2 percent slopes
Ae	Alligator silty clay loam, 1/2 to 2 percent slopes
CaA	Calloway silt loam, 0 to 2 percent slopes
CaB	Calloway silt loam, 2 to 5 percent slopes
Cm	Collins silt loam
Co	Collins silt loam, local alluvium
CpF2	Cuthbert and Providence soils, 12 to 35 percent slopes, eroded
Do	Dowling silty clay and clay
Fa	Falaya silt loam
Fl	Falaya silt loam, local alluvium
Fs	Falaya silty clay loam
Fw	Falaya and Waverly silt loams
GrA	Grenada silt loam, 0 to 2 percent slopes
GrB	Grenada silt loam, 2 to 5 percent slopes
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded
GrB3	Grenada silt loam, 2 to 5 percent slopes, severely eroded
GrC2	Grenada silt loam, 5 to 8 percent slopes, eroded
GrC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded
GrD2	Grenada silt loam, 8 to 12 percent slopes, eroded
GrD3	Grenada silt loam, 8 to 12 percent slopes, severely eroded
Gs	Gullied land, sandy
Gu	Gullied land, silty
He	Henry silt loam
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded
LoB3	Loring silt loam, 2 to 5 percent slopes, severely eroded
LoC	Loring silt loam, 5 to 8 percent slopes
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded
LoD	Loring silt loam, 8 to 12 percent slopes
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded
LoE2	Loring silt loam, 12 to 17 percent slopes, eroded
LoE3	Loring silt loam, 12 to 17 percent slopes, severely eroded
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded
MeB3	Memphis silt loam, 2 to 5 percent slopes, severely eroded
MeC3	Memphis silt loam, 5 to 8 percent slopes, severely eroded
MlF2	Memphis and Loring silt loams, 17 to 35 percent slopes, eroded
MlF3	Memphis and Loring silt loams, 17 to 35 percent slopes, severely eroded
MnF2	Memphis, Natchez, and Guin soils, 17 to 40 percent slopes, eroded
Mx	Mixed alluvial land
RpE2	Ruston, Providence, and Eustis soils, 12 to 17 percent slopes, eroded
RpF2	Ruston, Providence, and Eustis soils, 17 to 35 percent slopes, eroded
Wa	Waverly silt loam

Soil map constructed 1962 by Cartographic Division, Soil Conservation Service, USDA, from 1957 aerial photographs. Controlled mosaic based on Mississippi plane coordinate system, west zone, transverse Mercator projection. 1927 North American datum.

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Dual
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Railroad
- Ferries
- Ford
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings
- School
- Church
- Station

Mines and Quarries

Mine dump

Pits, gravel or other

Power lines

Pipe lines

Cemeteries

Dams

Levees

Tanks

Oil wells

Cotton gin

Sawmill

BOUNDARIES

- National or state
- County
- Township, U. S.
- Section line, corner
- Reservation
- Land grant

DRAINAGE

Streams
- Perennial
- Intermittent, unclass.

Canals and ditches — CANAL, DITCH

Lakes and ponds
- Perennial
- Intermittent

Wells — flowing

Springs

Marsh

Wet spot

RELIEF

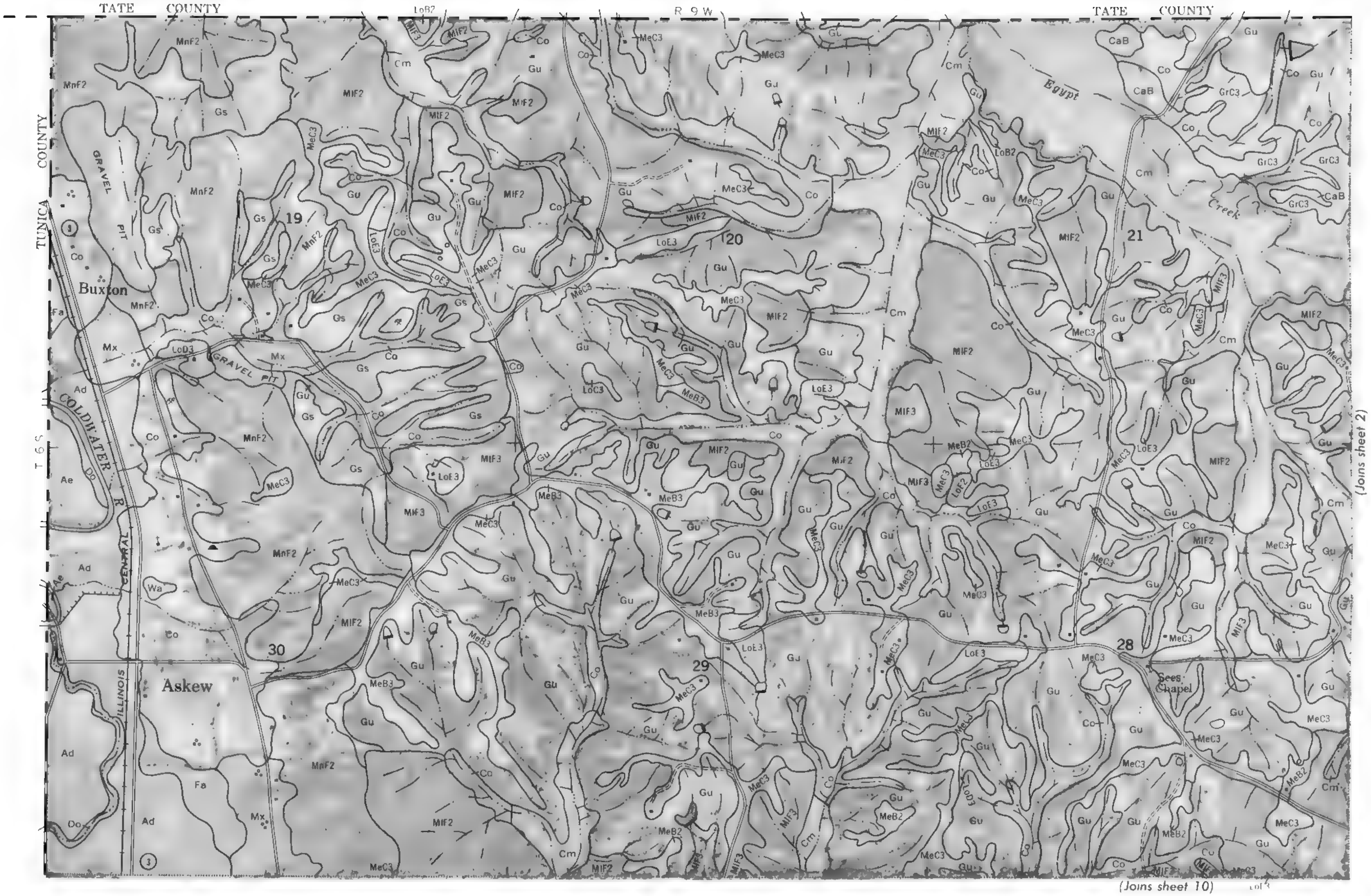
Escarpments
- Bedrock
- Other

Prominent peaks

Depressions — Large, Small
- Crossable with tillage implements
- Not crossable with tillage implements
- Contains water most of the time

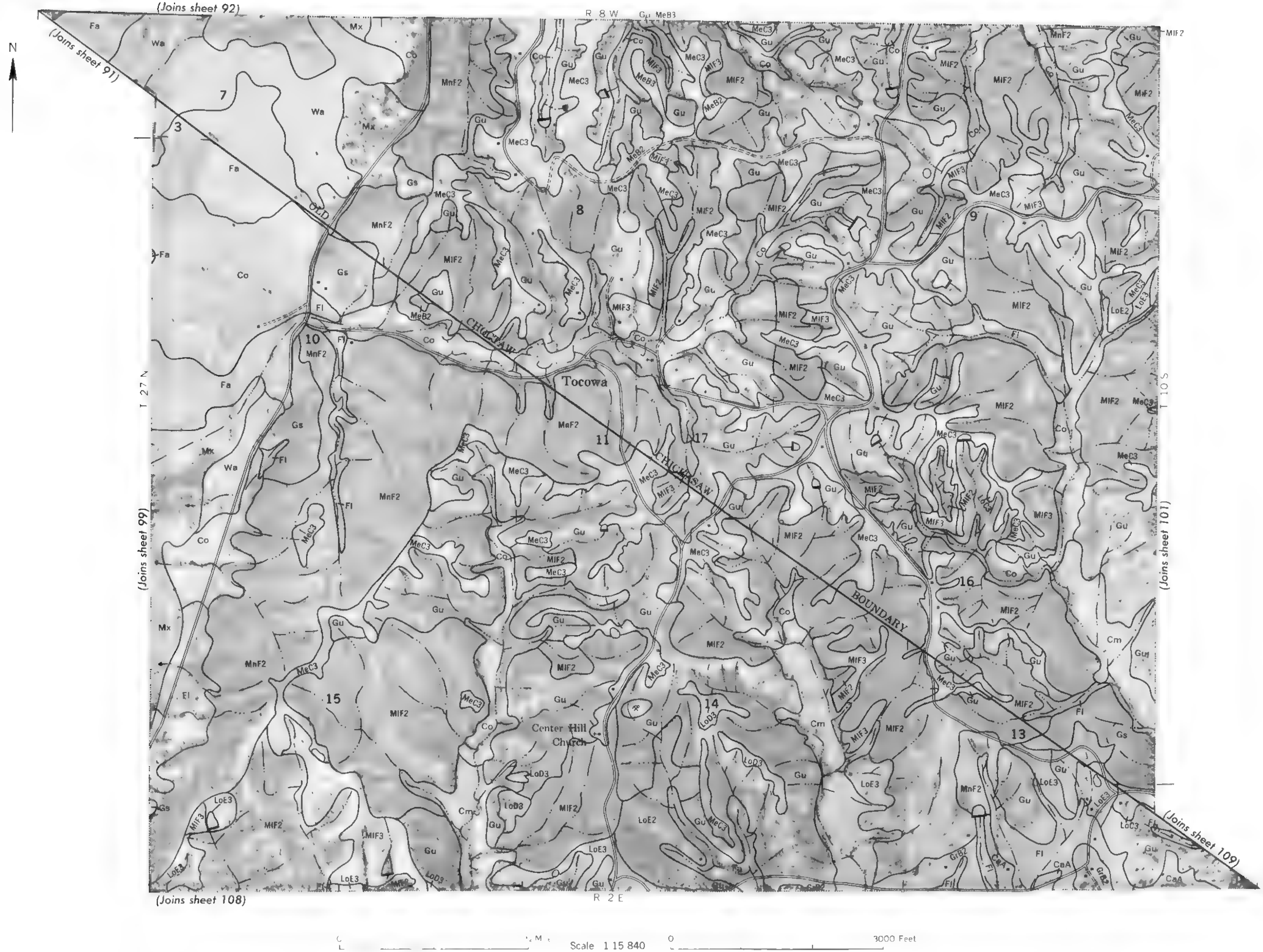
SOIL SURVEY DATA

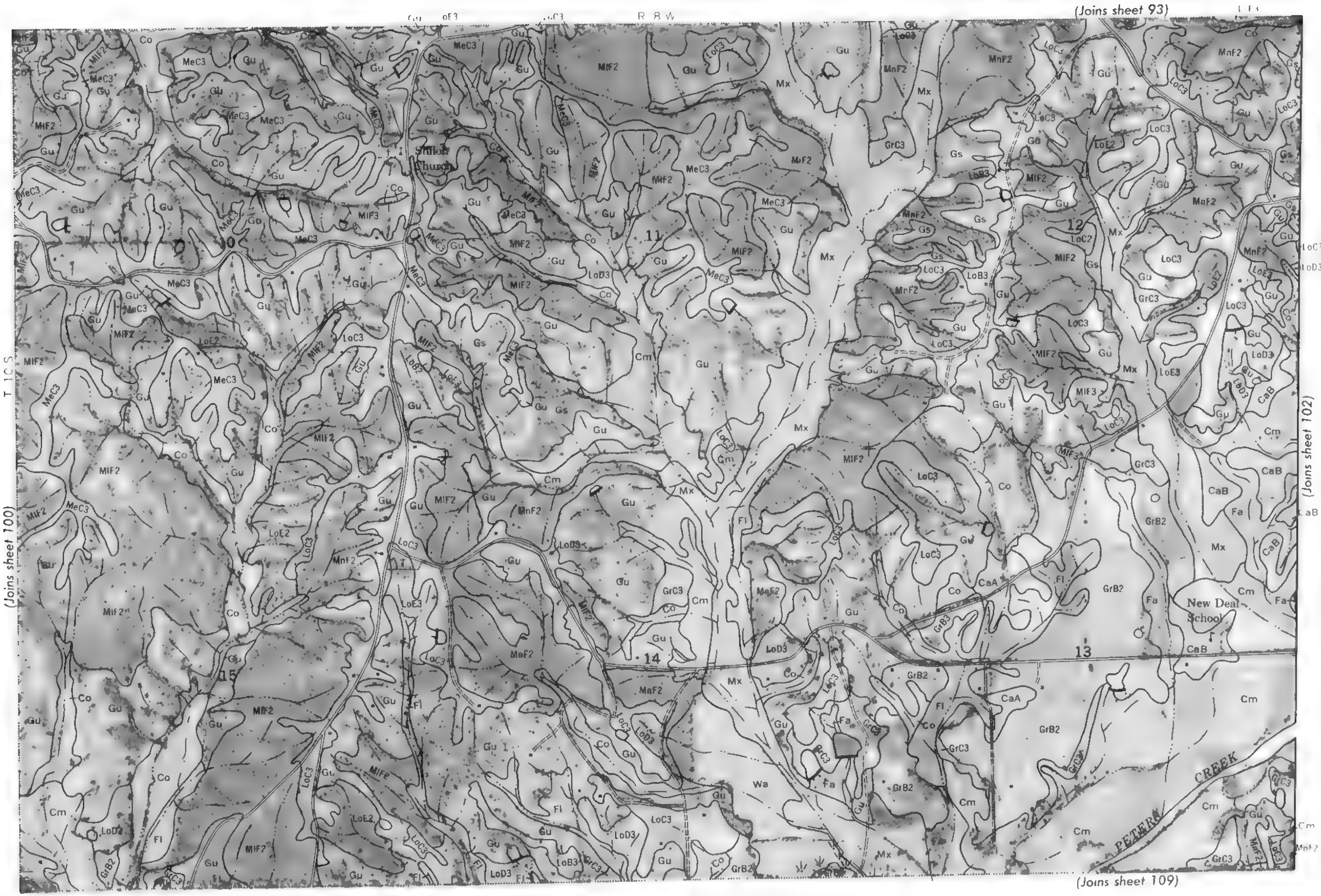
- Soil boundary and symbol — Dx
- Gravel
- Stones
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gullies



0 ½ Mile Scale 1:15 840 0 3000 Feet


N
(Joins sheet 1)
R 9 W
(Joins sheet 19)
(Joins sheet 11)
TUNICA COUNTY
QUITMAN COUNTY
CENTRAL
ILLINOIS
Crenshaw
Kirkwell Creek
Creek
Creek
Fowler
Branch
GRAVEL PIT
GRAVEL PIT
31
32
33
6
5
4
T 6 S
T 7 S
Scale 1:15 840
0
3000 Feet

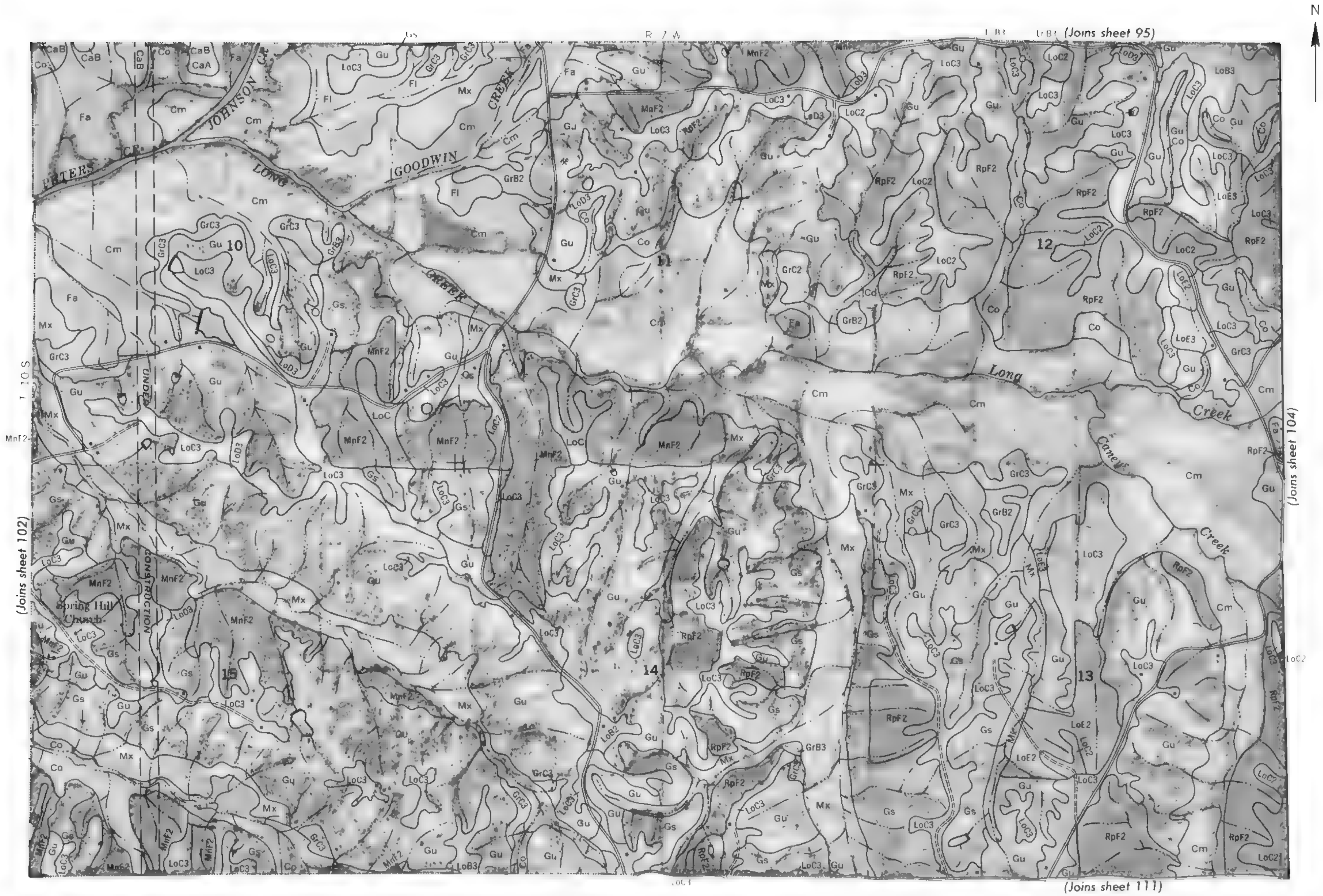

(Joins sheet 92)
(Joins sheet 91)
(Joins sheet 99)
(Joins sheet 101)
(Joins sheet 108)
(Joins sheet 109)
N
R 8 W
R 2 E
T 27 N
T 10 S
Tocowa
Center Hill Church
OLD CHOCTAW CHICKASAW BOUNDARY
Scale 1:15 840
0
3000 Feet



Scale 1:15 840

102

0 ½ Mile Scale 1:15 840 0 3000 Feet



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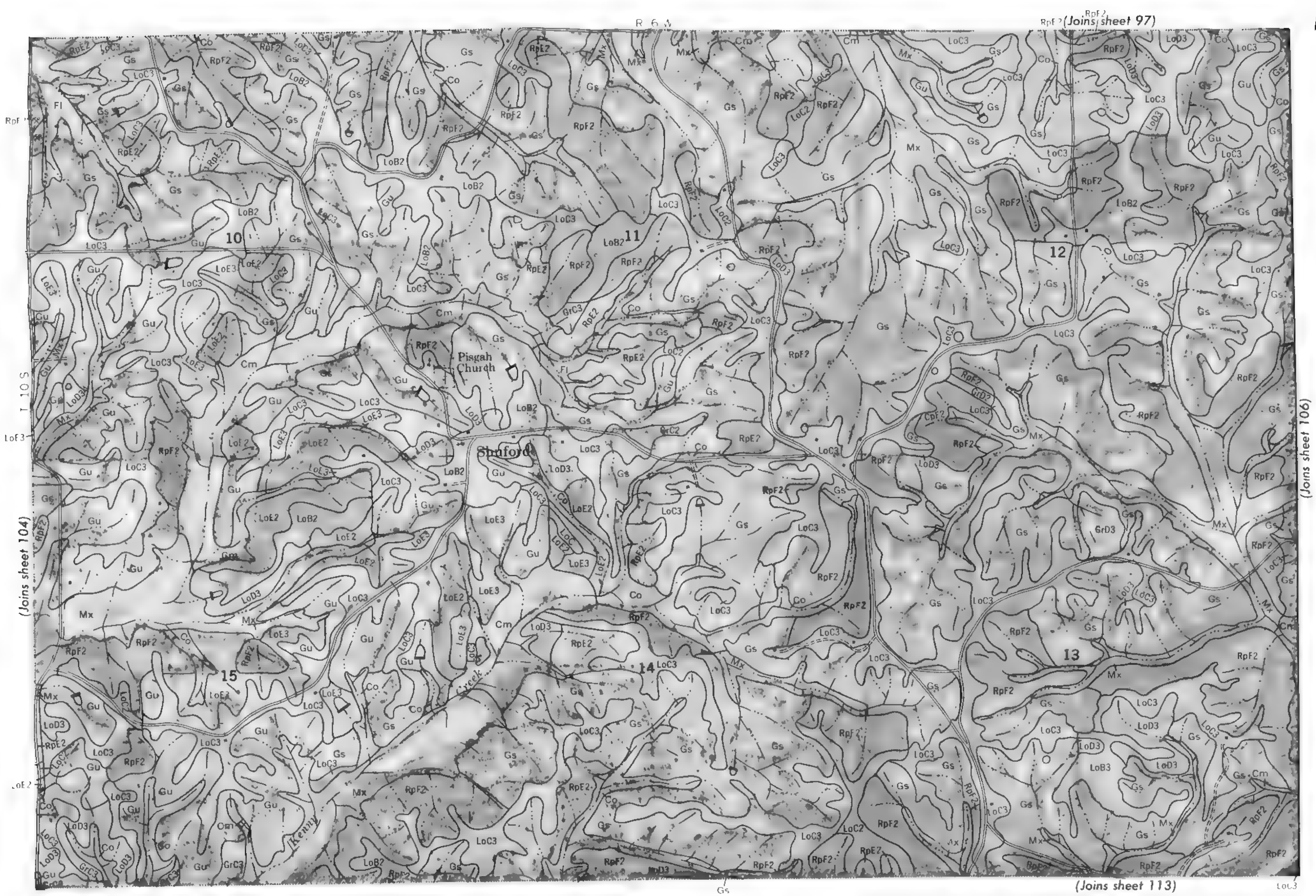
0 ½ Mile Scale 1:15 840 0 3000 Feet



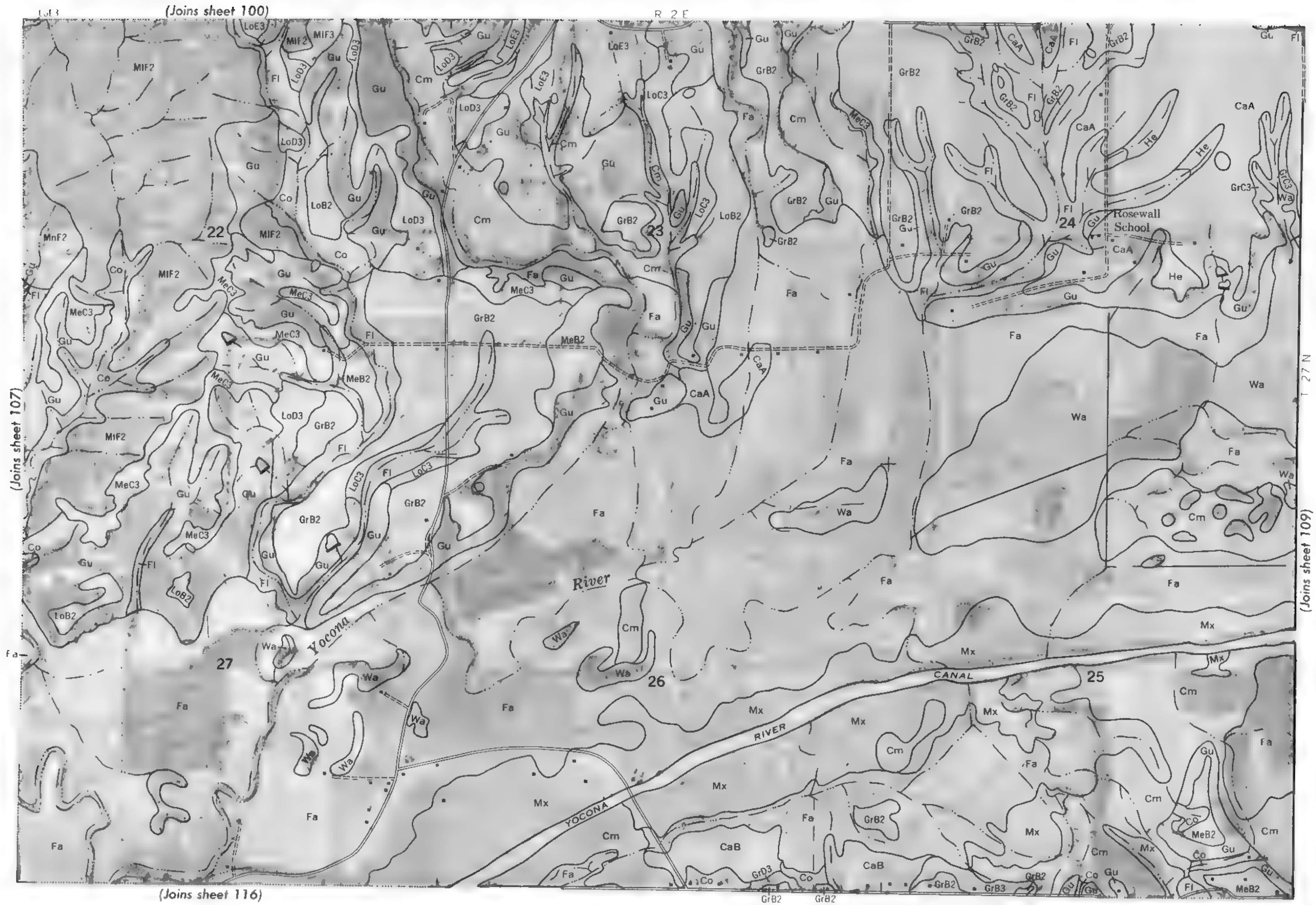
½ Mile Scale 1:15 840 0

0 ½ Mile Scale 1:15840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite

½ Mile Scale 1:15 840 3000 Feet

N

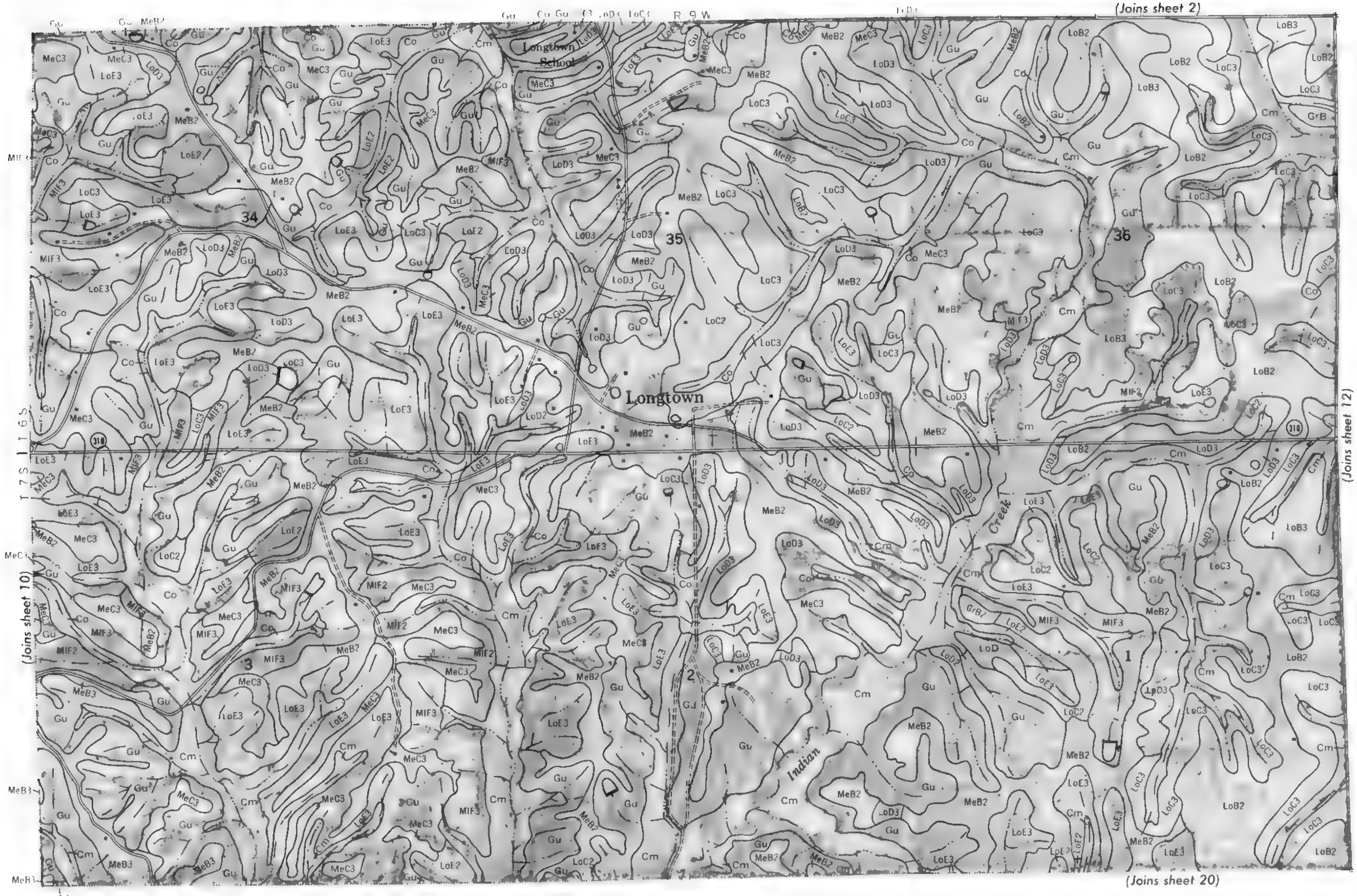


0 ½ Mile Scale 1:15 840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite

Scale 1:15 840

1000 Feet



Range, township, and section corners shown on this map are indefinite

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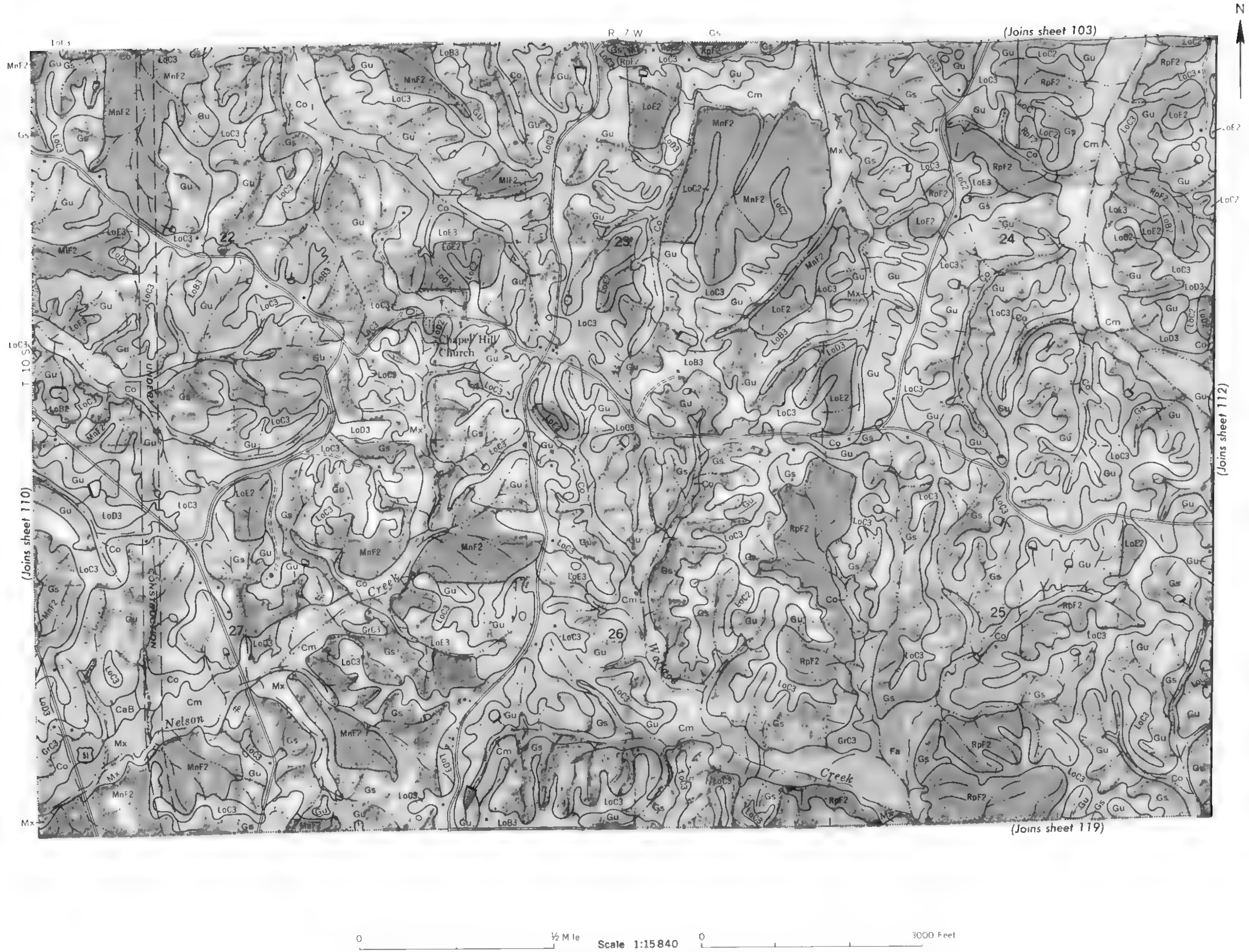
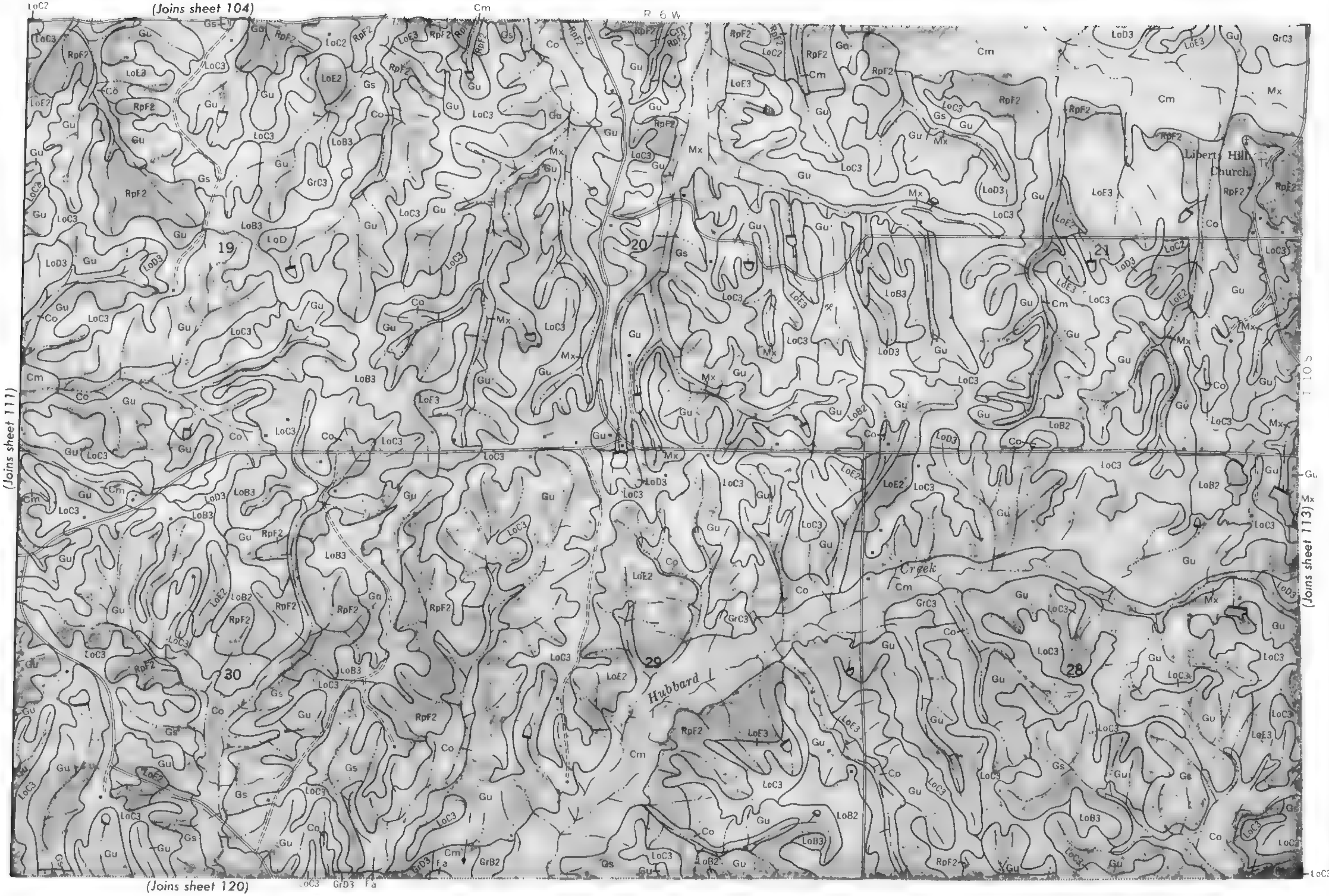
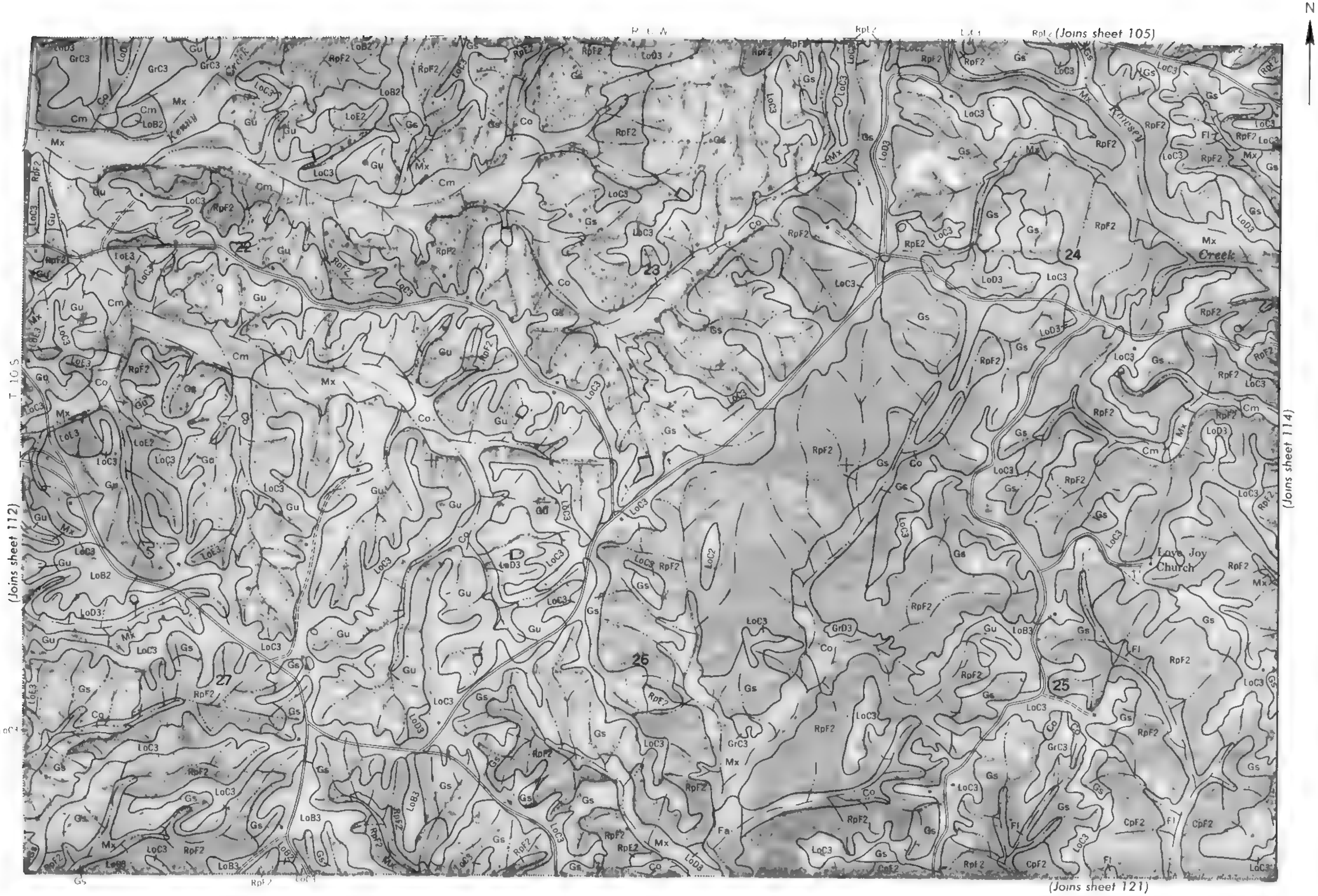
0 ½ Mile Scale 1:15 840 0 3000 Feet


111
N
R. 7 W.
T. 10 S.
(Joins sheet 103)
(Joins sheet 112)
(Joins sheet 119)
(Joins sheet 110)
Chapel Hill Church
Nelson
Creek
22
23
24
25
26
27
0
½ Mile
Scale 1:15 840
0
3000 Feet

N



0 Mile Scale 1:15 840 0 5000 Feet



0 1/2 Mile Scale 1:15 840 0 3000 Feet

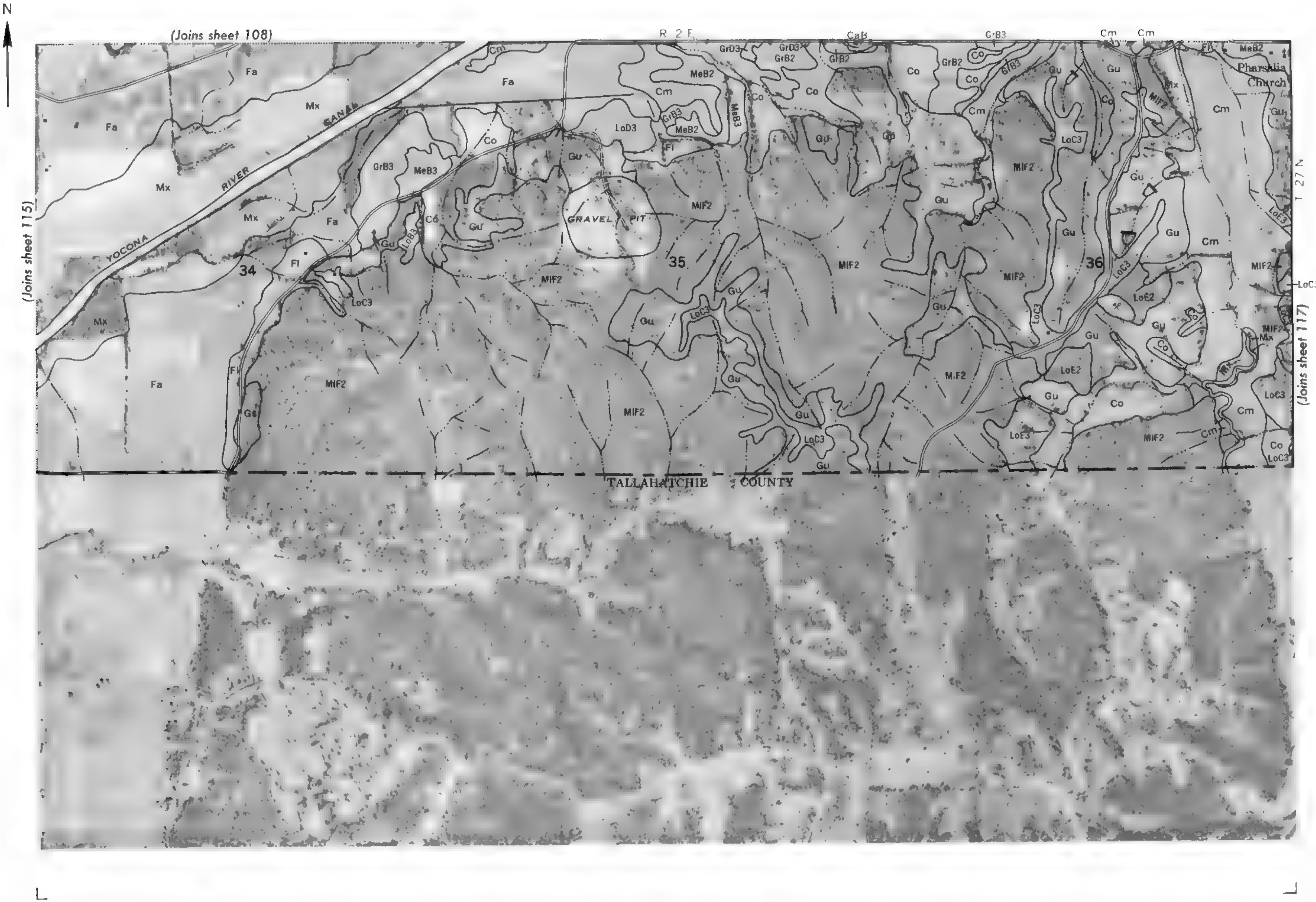
PANOLA COUNTY, MISSISSIPPI — SHEET NUMBER 114

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1962 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Mississippi Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

½ Mile Scale 1:15 840 3000 Feet

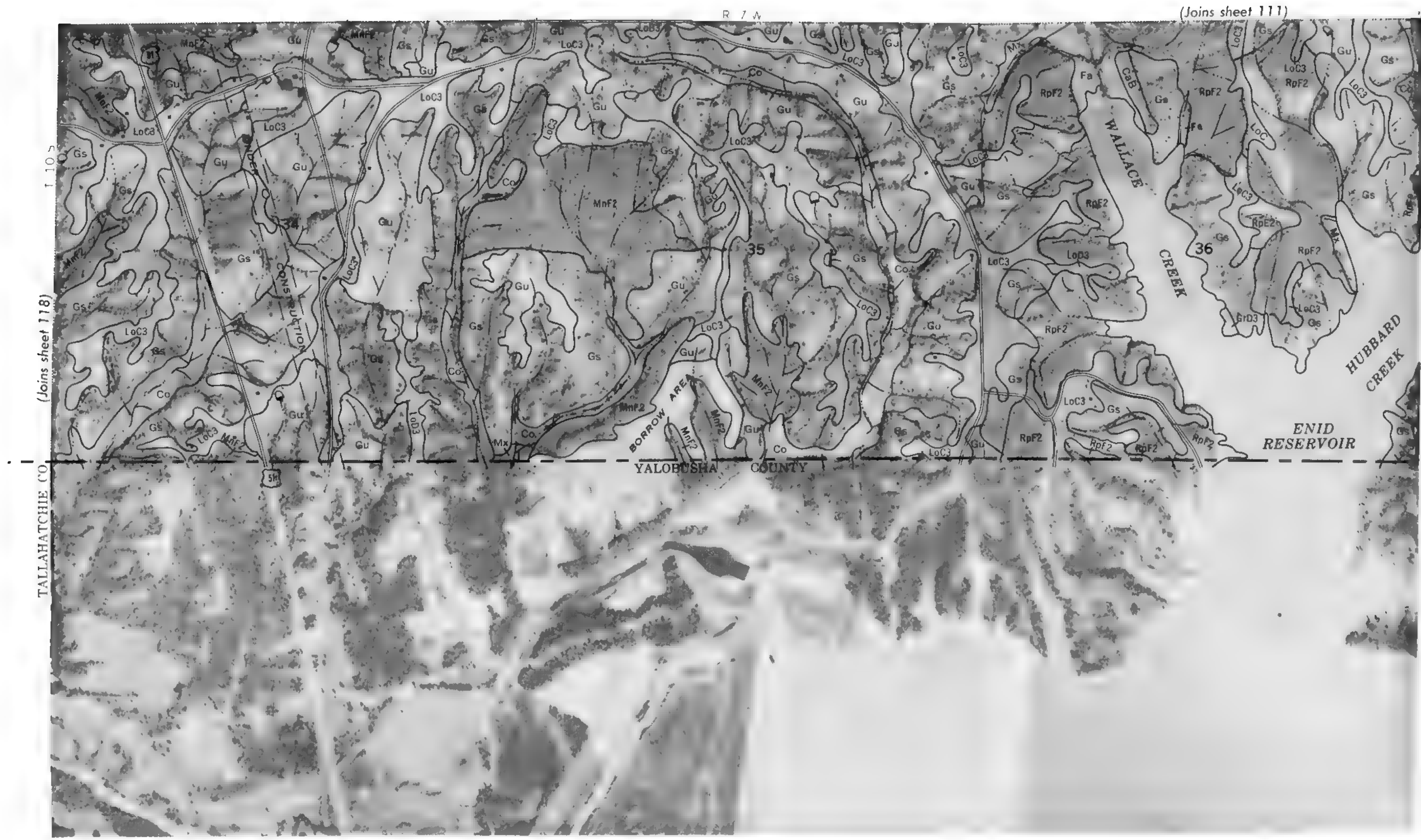


0 ½ Mile Scale 1:15 840 0 3000 Feet

Range, township and section corners shown on this map are indefinite

Scale 1:15 840 0 1000 Feet

0 ½ Mile Scale 1:15 840 0 3000 Feet



This map is one of a set compiled in 1962 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Mississippi Agricultural Experiment Station.
Range, township, and section corners shown on this map are indefinite.

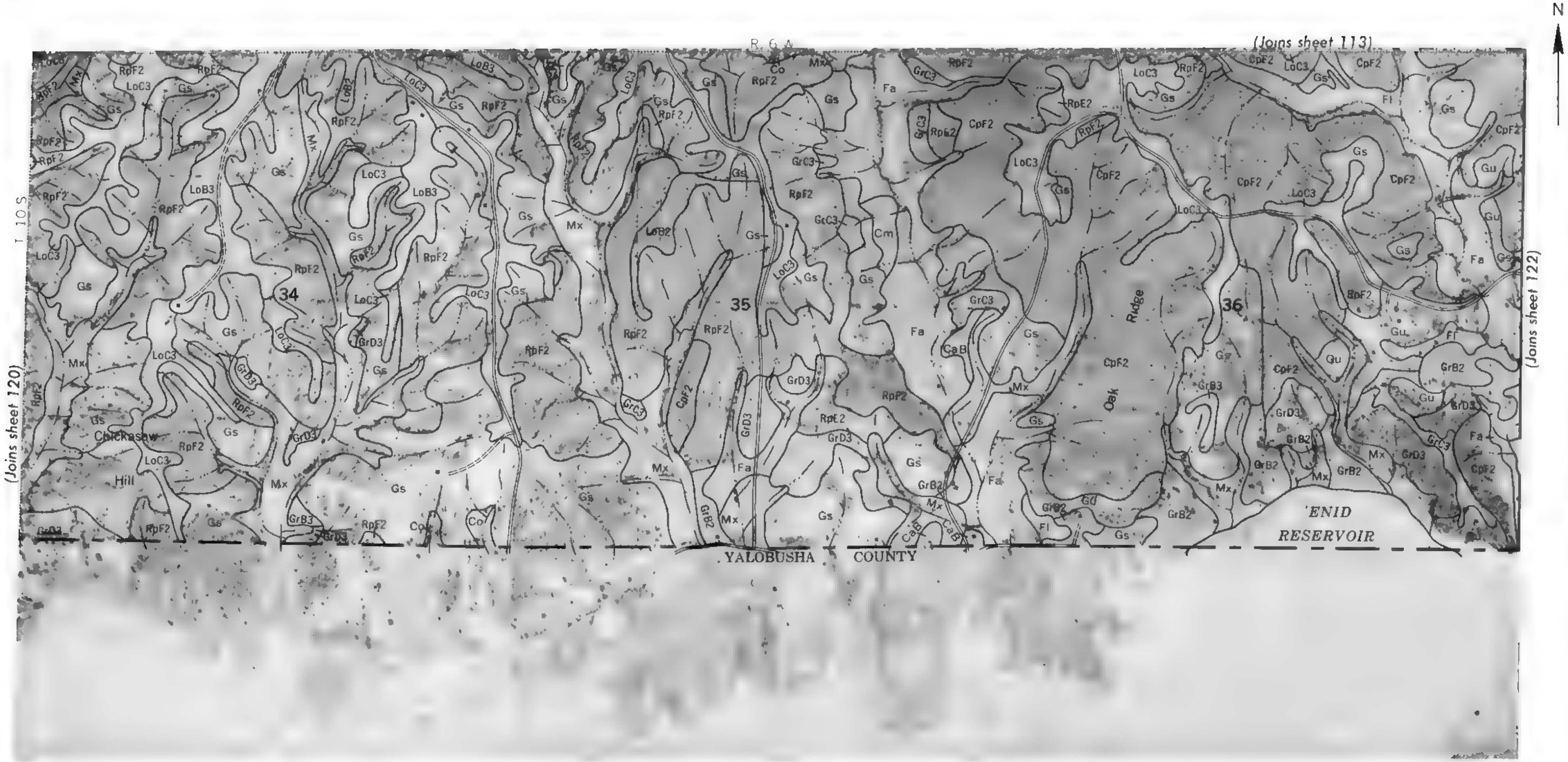
0 ½ Mile Scale 1:15840 0 5000 Feet

12

0 ½ Mile Scale 1:15 840 0 3,000 Feet

PANOLA COUNTY, MISSISSIPPI — SHEET NUMBER 120

0 ½ Mile Scale 1:15 840 0 3000 Feet

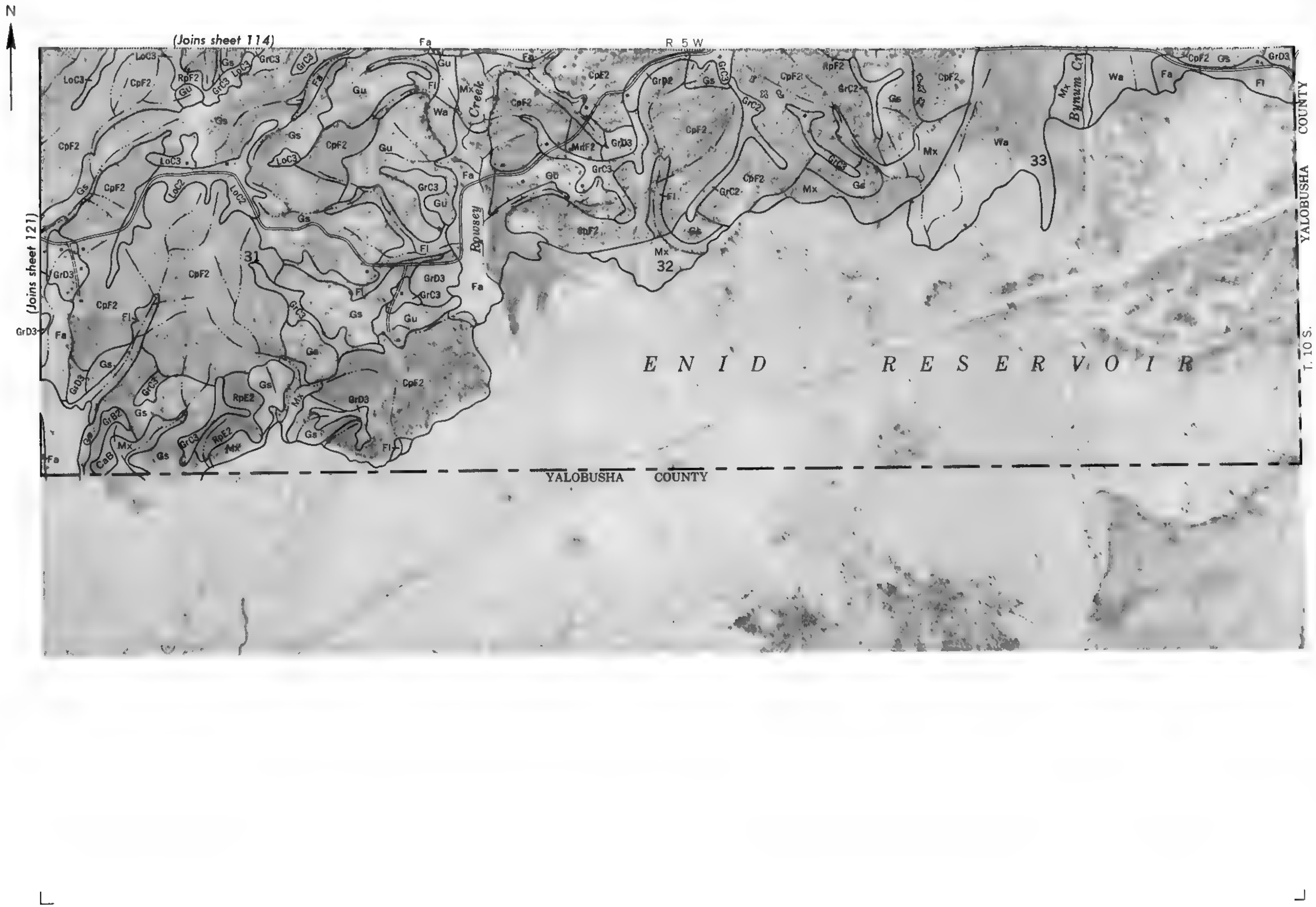


0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1962 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Mississippi Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

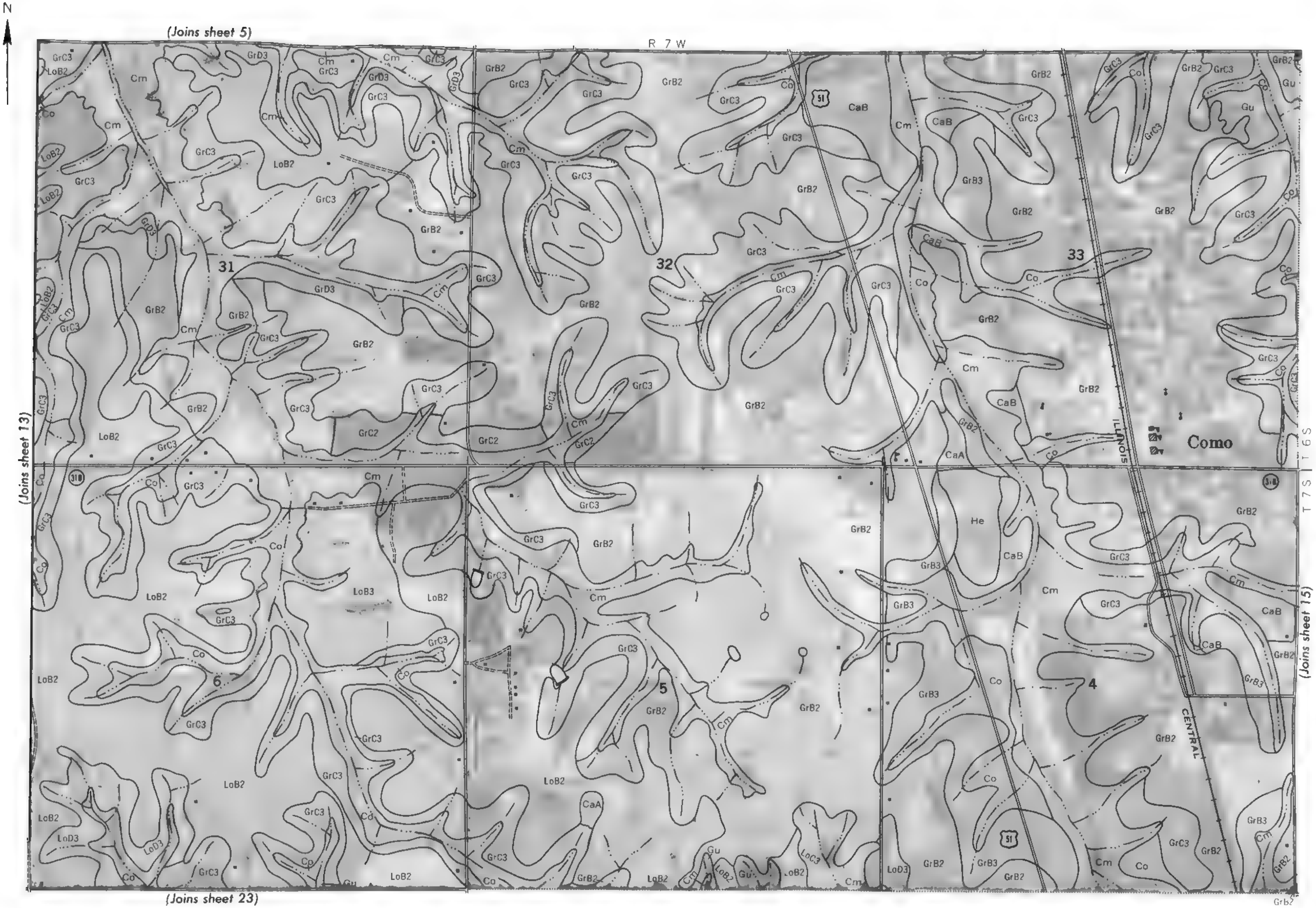
(122)



0 ½ Mile Scale 1:15840 0 3000 Feet

0 ½ Mile Scale 1:15840 0 1000 Feet

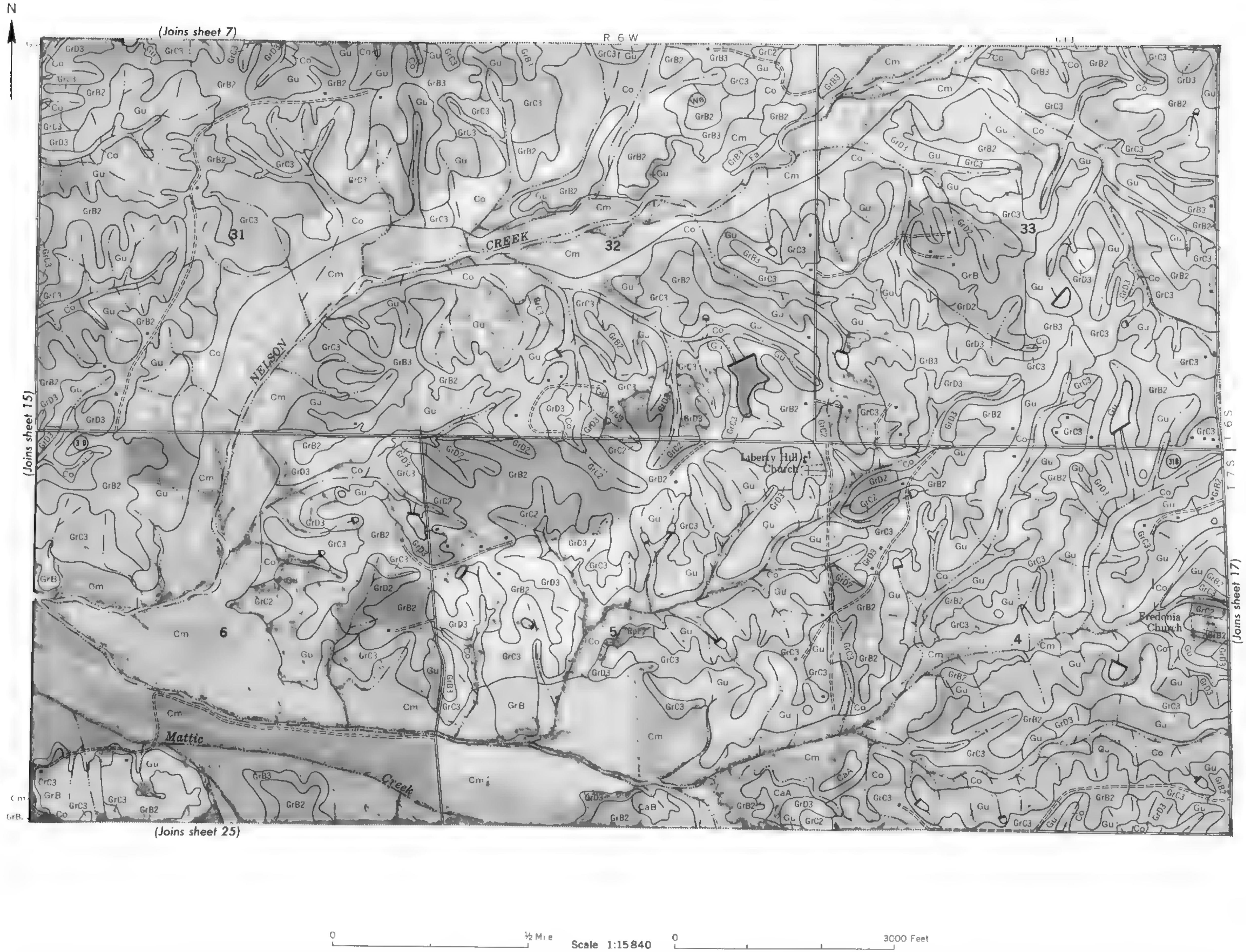
PANOLA COUNTY, MISSISSIPPI — SHEET NUMBER 14



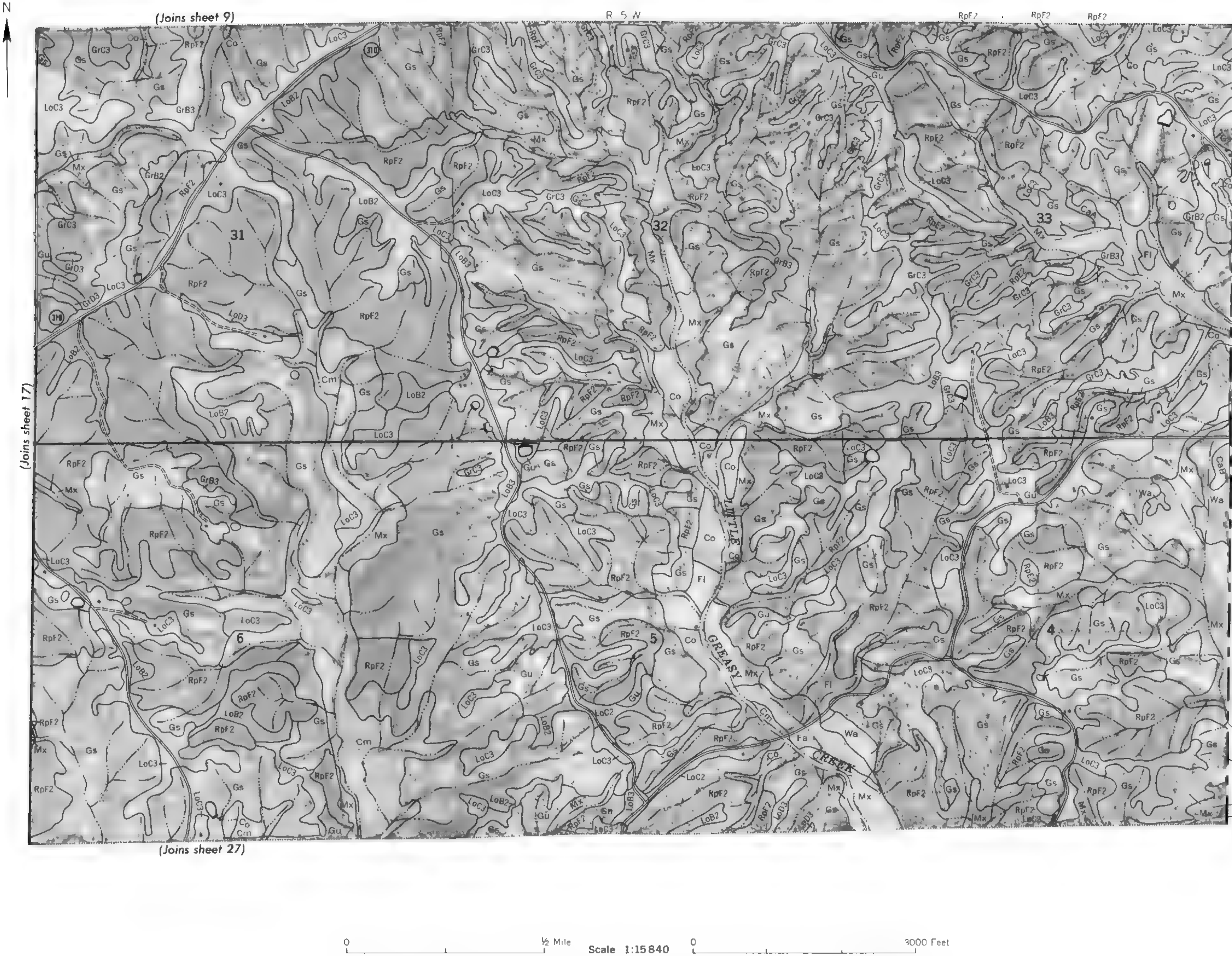
0 ½ Mile Scale 1:15 840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite

0 ½ Mile Scale 1:15 840 0 3000 Feet


N
(Joins sheet 7)
R 6 W
(Joins sheet 15)
(Joins sheet 17)
(Joins sheet 25)
T 6 S
T 7 S
NELSON
CREEK
Mattic
Creek
Liberty Hill Church
Fredonia Church
31
32
33
6
5
4
0
½ Mile
Scale 1:15840
0
3000 Feet

0 ½ Mile Scale 1:15 840 0 4000 Feet


N
(Joins sheet 9)
R 5 W
(Joins sheet 17)
(Joins sheet 27)
T 6 S
T 7 S
LAFAYETTE COUNTY
LITTLE
GREASY
CREEK
31
32
33
6
5
4
0
½ Mile
Scale 1:15 840
0
3000 Feet

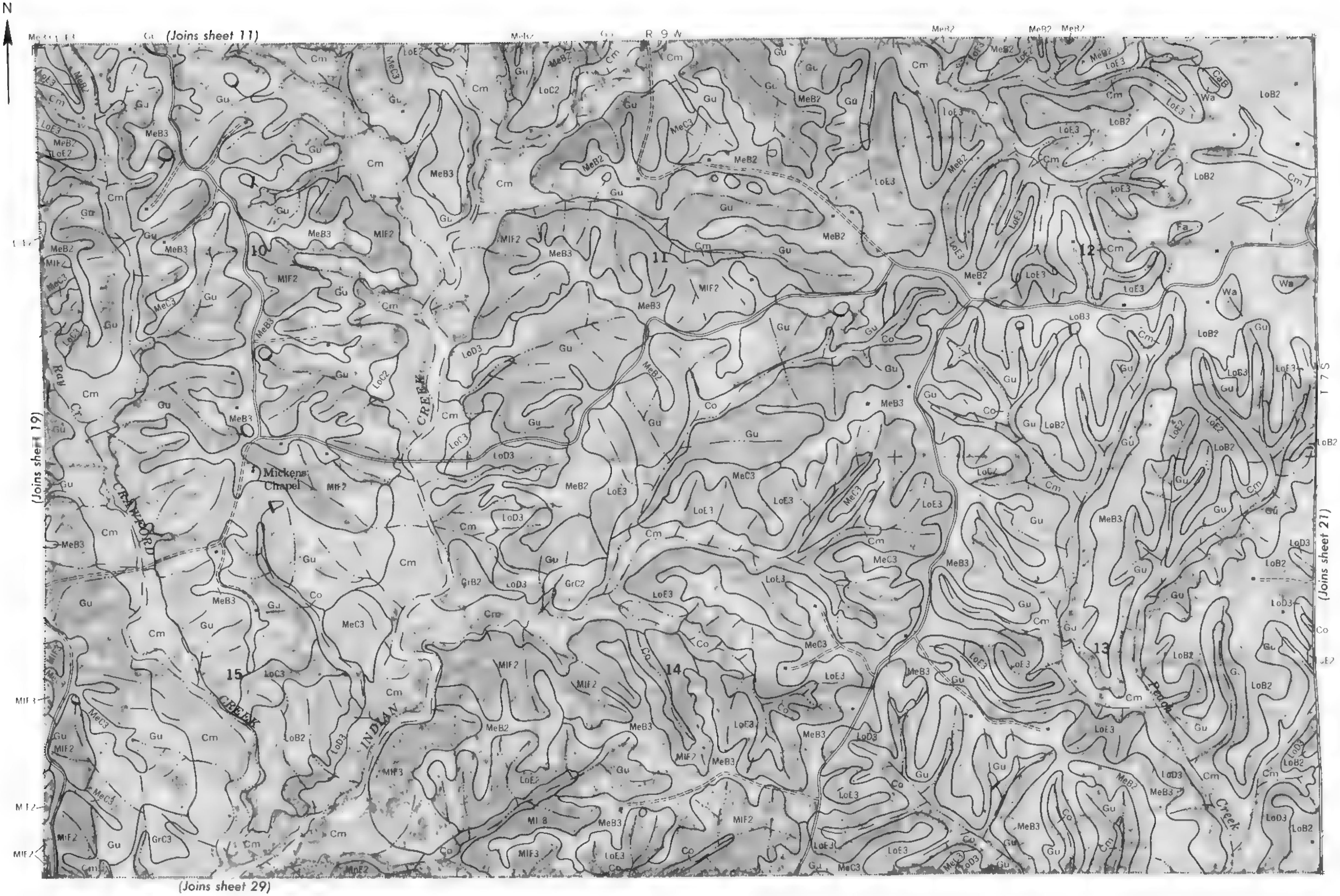
Range, township and section corners shown on this map are indefinite

0 ½ Mile Scale 1:15 840 0 3000 Feet

PANOLA COUNTY, MISSISSIPPI — SHEET NUMBER 2

1 Mile Scale 1:15 840 0 3000 Feet

20



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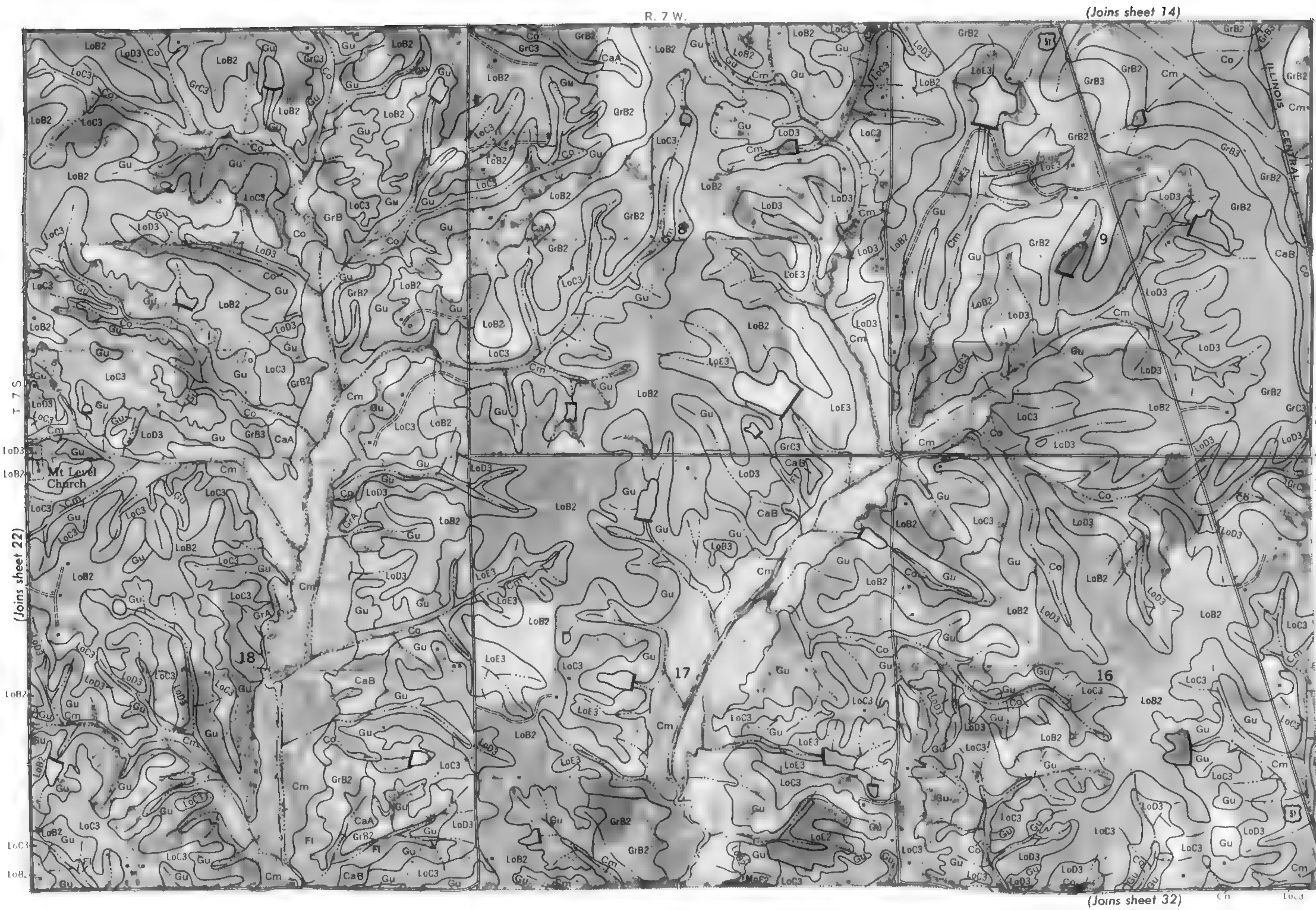
Scale 1:15840

0 ½ Mile Scale 1:15840 0 3000 Feet



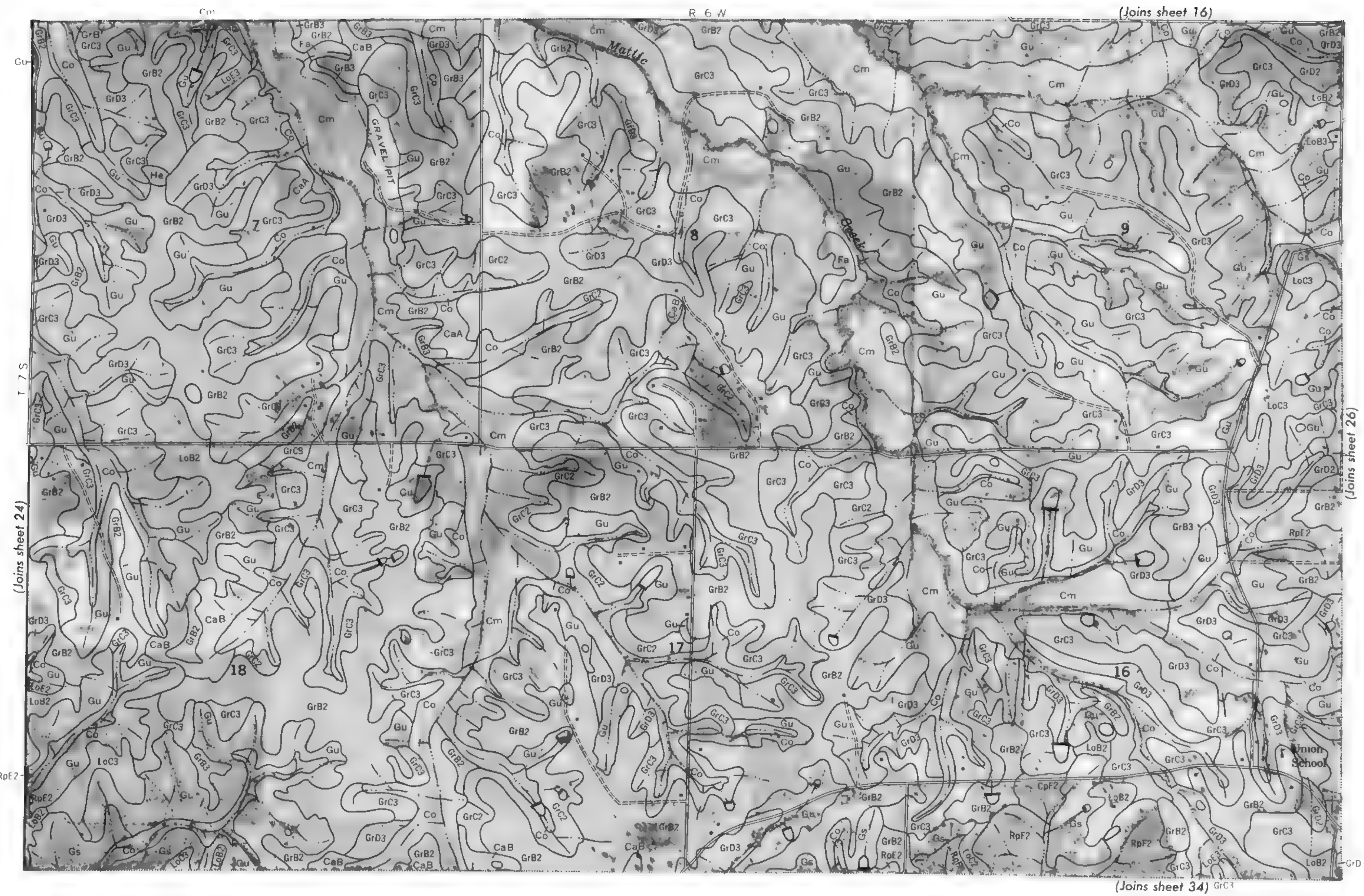
Range, township and section corners shown on this map are indefinite

0 ½ Mile Scale 1:15 840 0 3000 Feet

Scale 1:15 840

½ Mile

0



This map is one of a set compiled in 1962 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Mississippi Agricultural Experiment Station.

Range, township, and section corners shown on this map are approximate.

0 ½ Mile Scale 1:15 840 0 4000 Feet

0 ½ Mile Scale 1:15 840 0 3000 Feet

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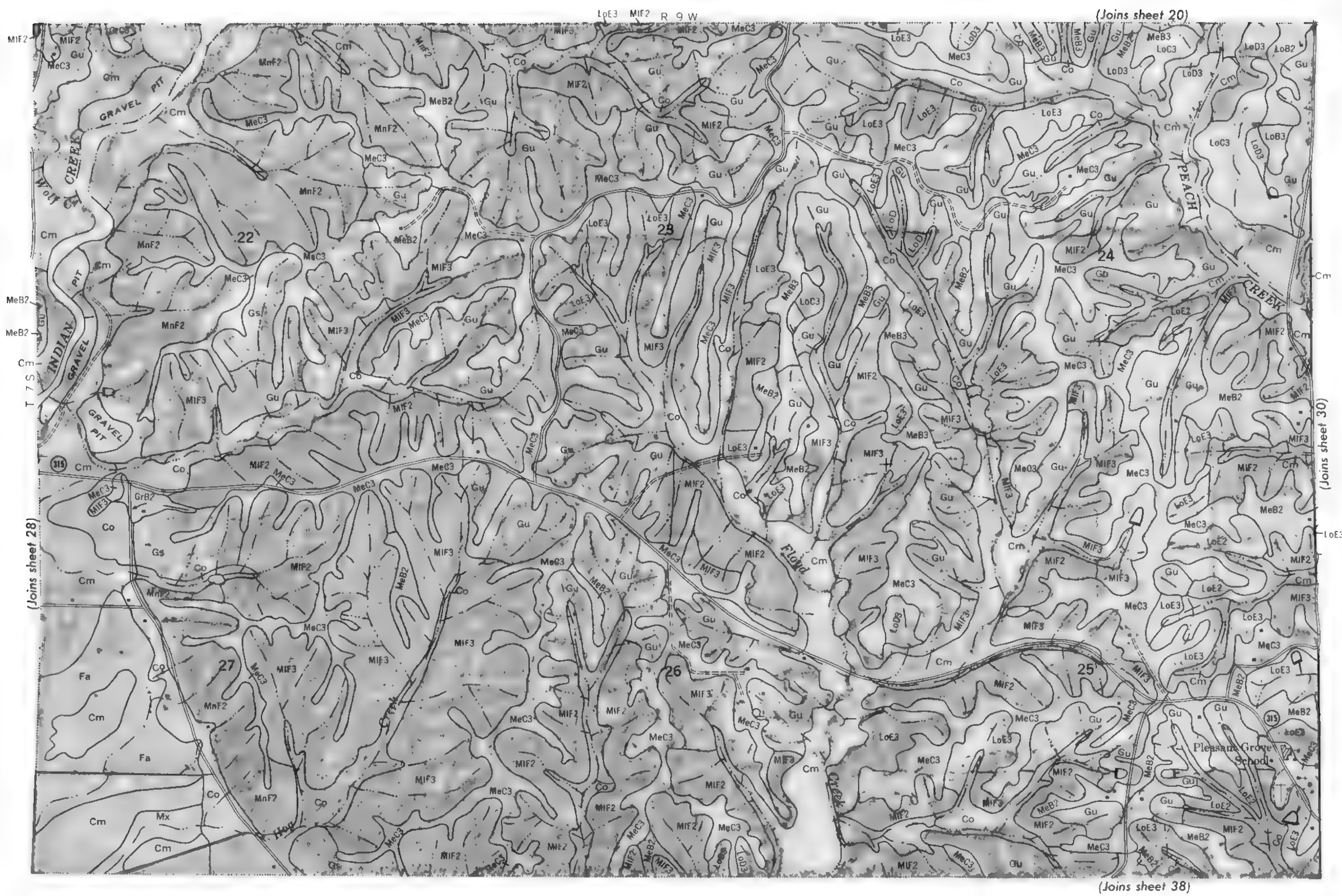
0 ½ Mile Scale 1:15 840 0 3000 Feet

0 ½ Mile Scale 1:15 840 0 3000 Feet



Range, township, and section corners shown on this map are indefinite

0 ½ Mile Scale 1:15 840 0 3000 Feet

0 ½ Mile Scale 1:15 840 0

PANOLA COUNTY, MISSISSIPPI — SHEET NUMBER 30

0 ½ Mile Scale 1:15 840 0 3000 Feet

0 ½ Mile Scale 1 15840 0 3000 Feet

Scale 1:15840

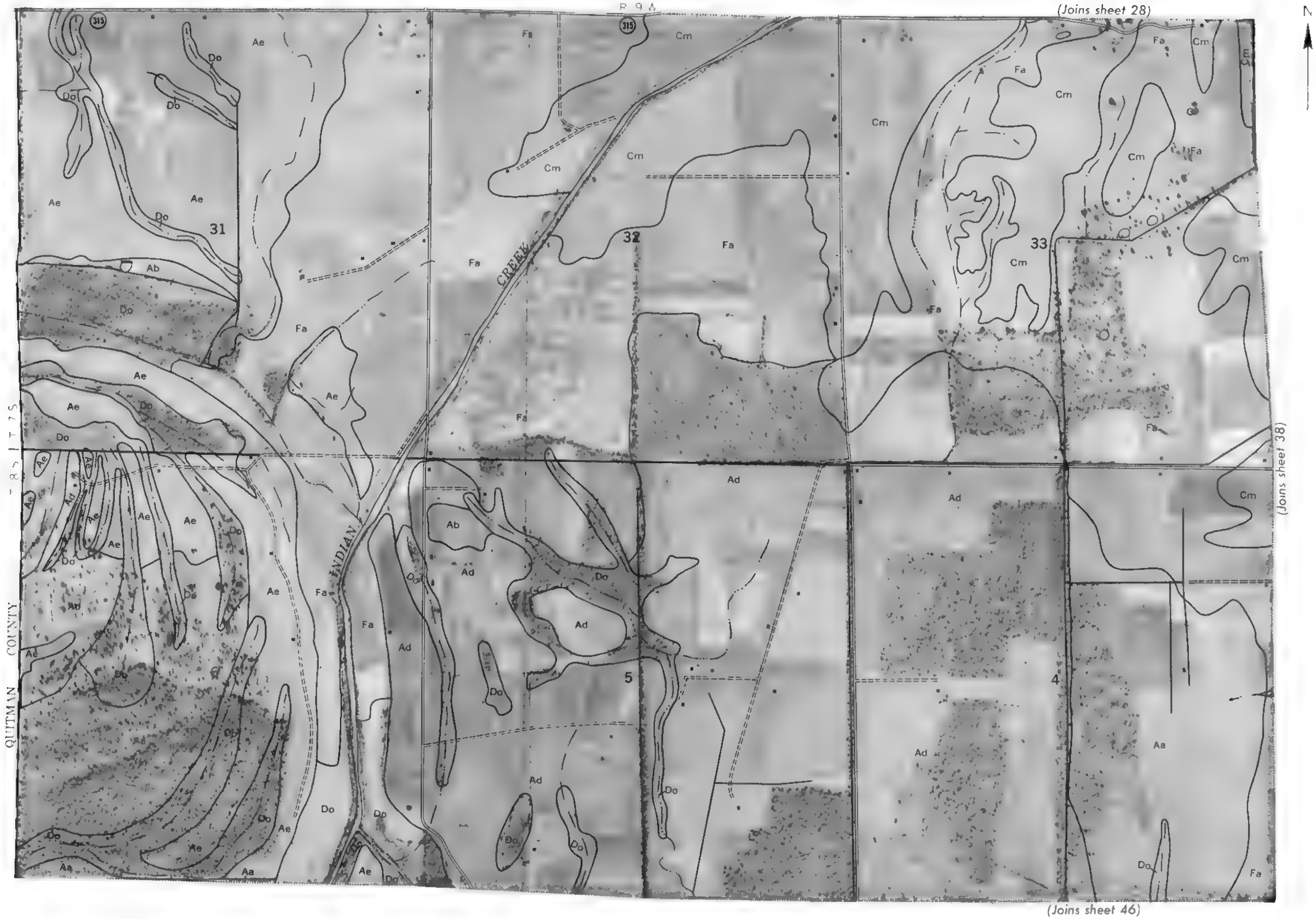
0 ½ Mile Scale 1:15 840 0 3000 Feet

PANOLA COUNTY, MISSISSIPPI — SHEET NUMBER 34

Range, township and section corners shown on this map are indefinite.

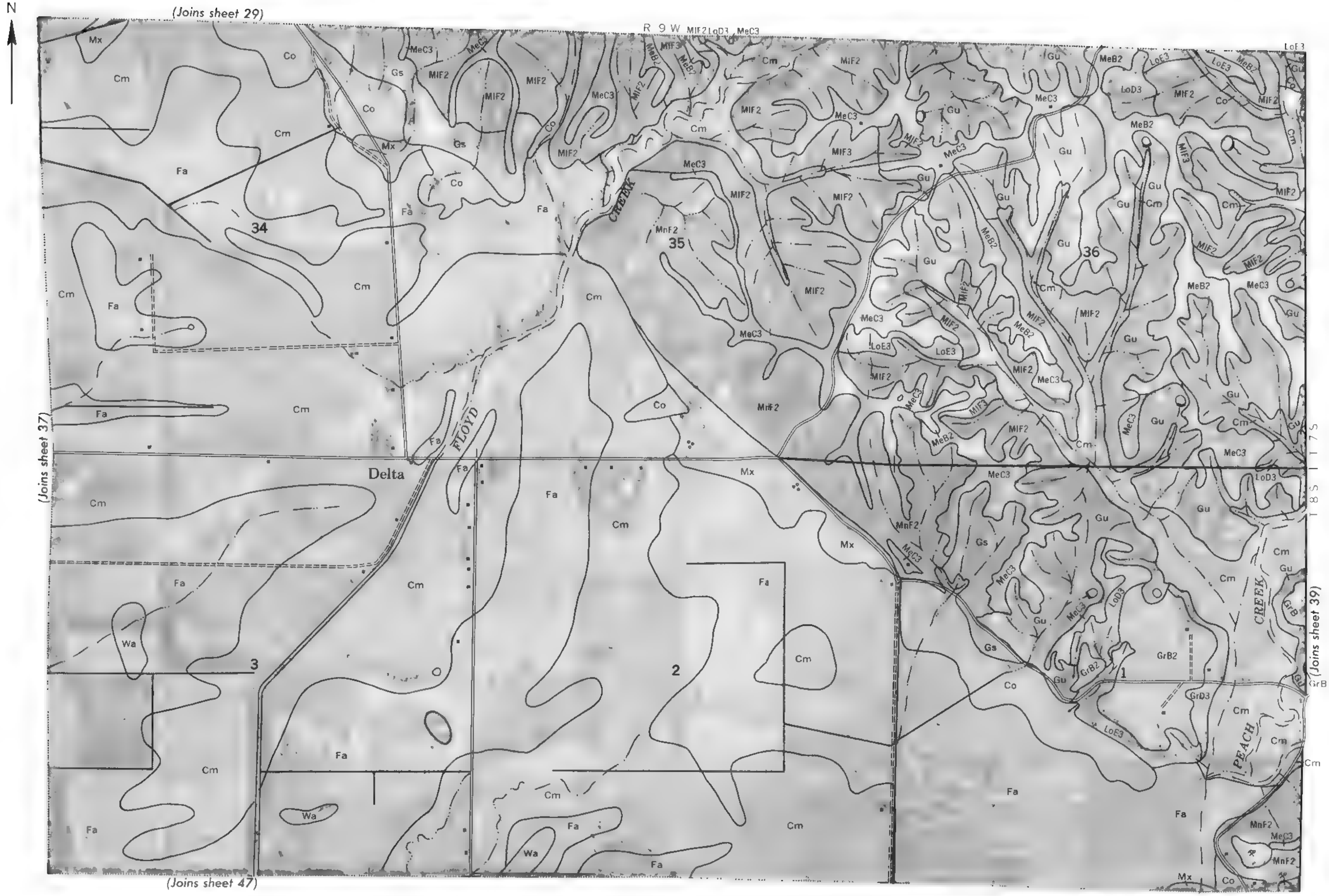
½ Mile Scale 1:15 840 0 4000 Feet


N
(Joins sheet 27)
(Joins sheet 35)
(Joins sheet 45)
LAFAYETTE COUNTY
SARDIS RESERVOIR
LITTLE TALLAHATCHIE RIVER
Nelson Creek
Hayes Crossing
19
20
21
30
RpF2
Gs
Mx
LoC3
LoB2
LoD3
GrD2
GrC3
GrB2
Wa
Gu
Scale 1:15 840
1 Mile
4000 Feet

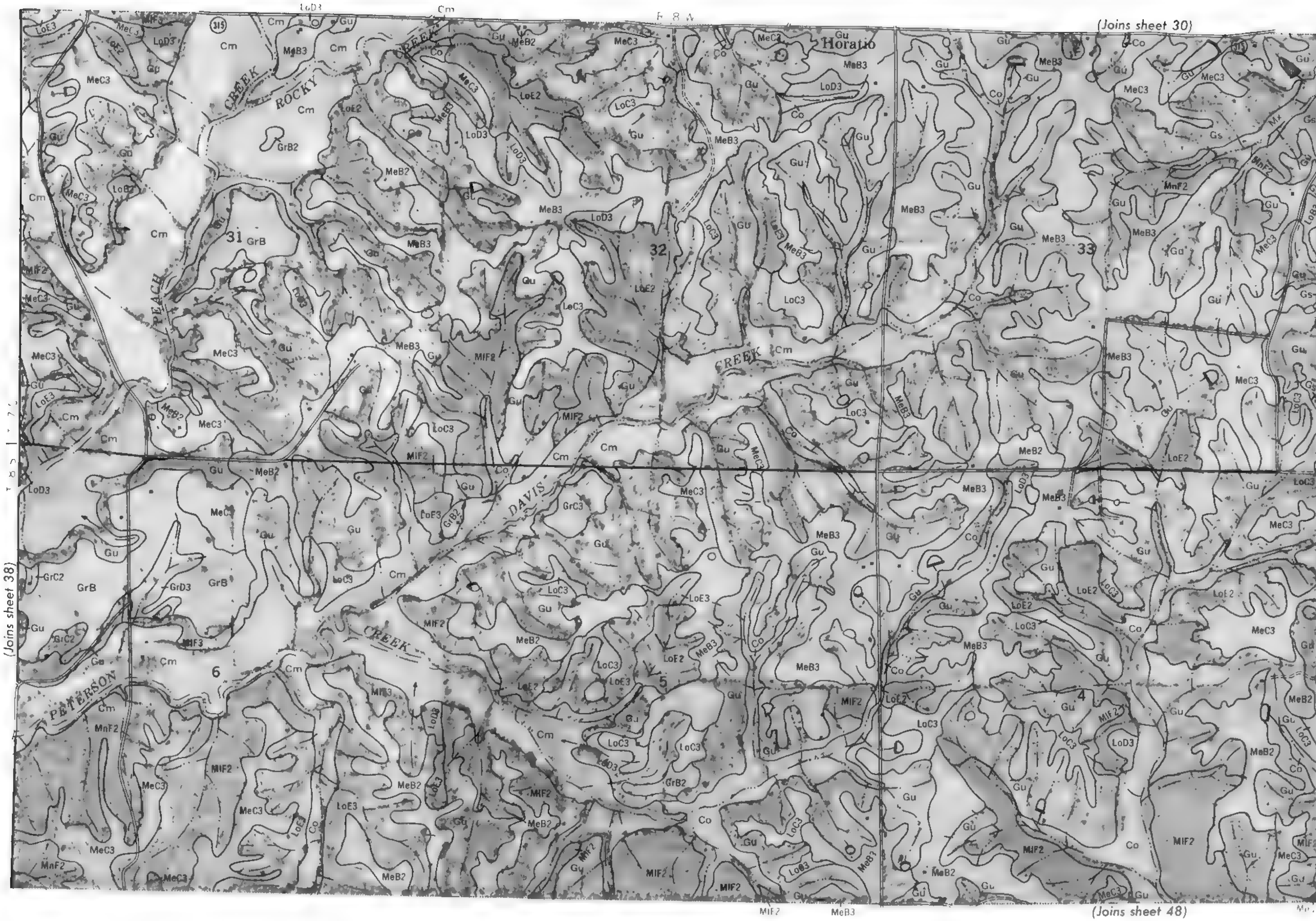


Scale 1:15 840

3000 Feet

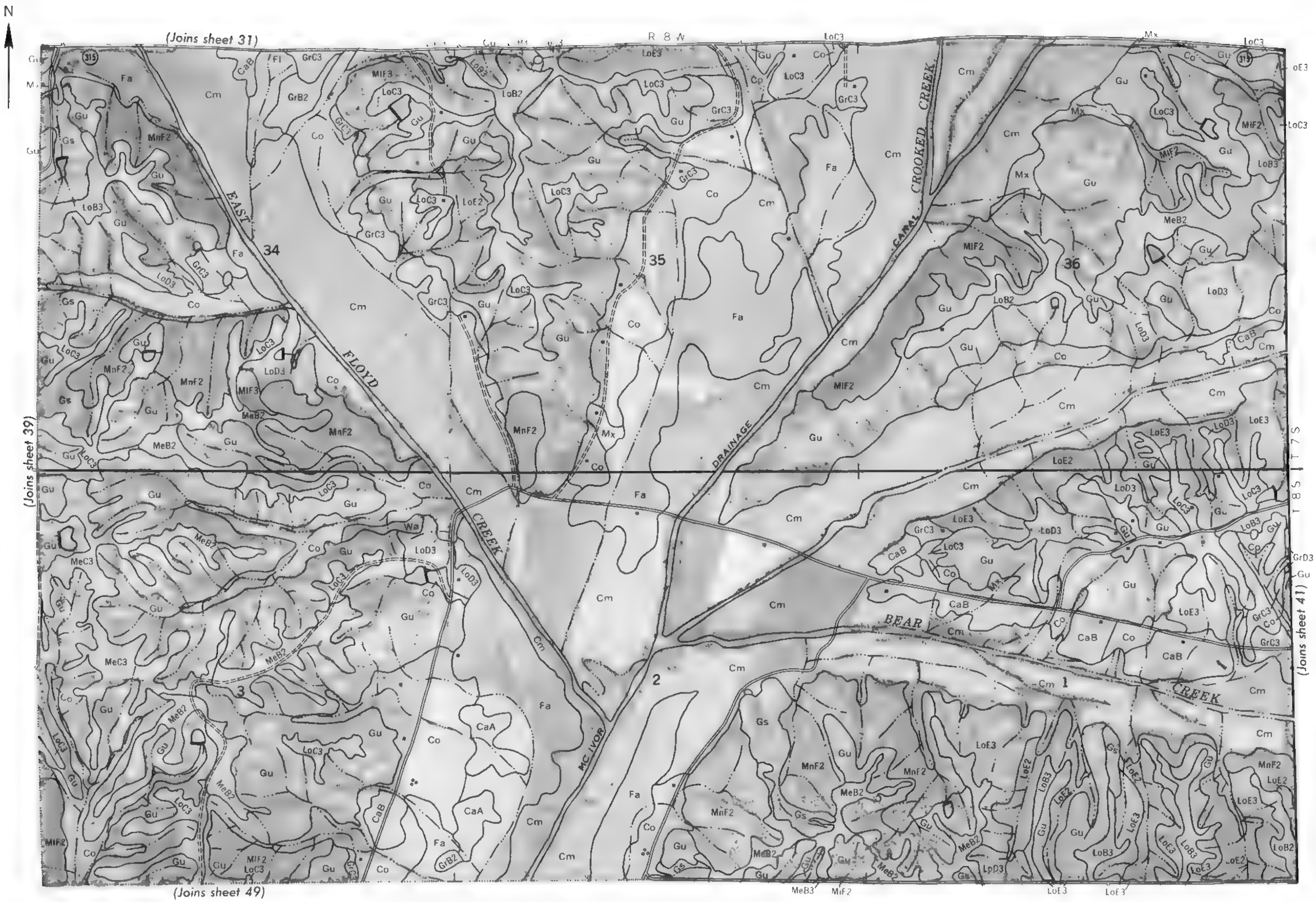


0 ½ Mile Scale 1:15 840 0 3000 Feet



½ Mile Scale 1:15 840

0 ½ Mile Scale 1:15 840 0 3000 Feet

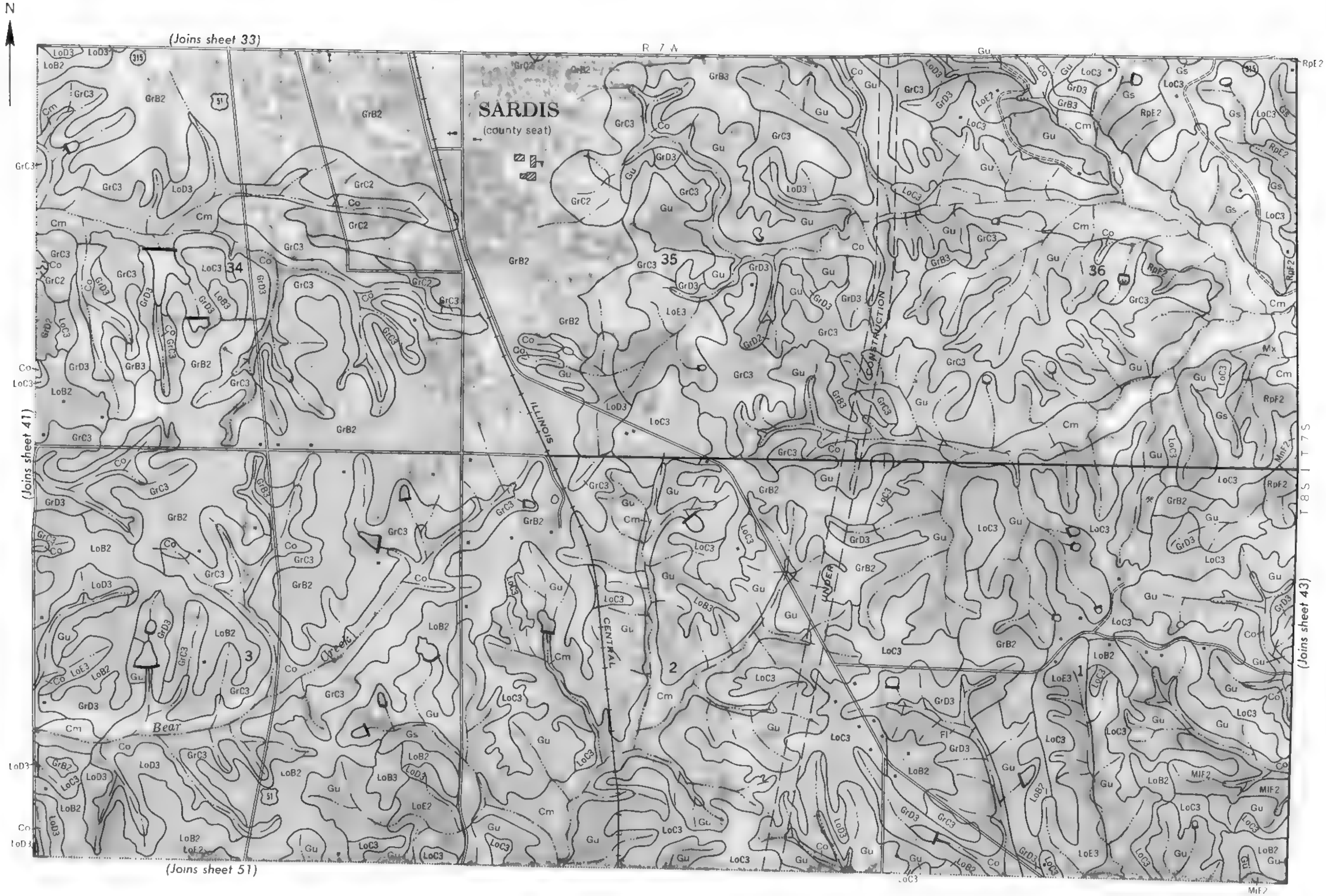


Scale 1:15 840

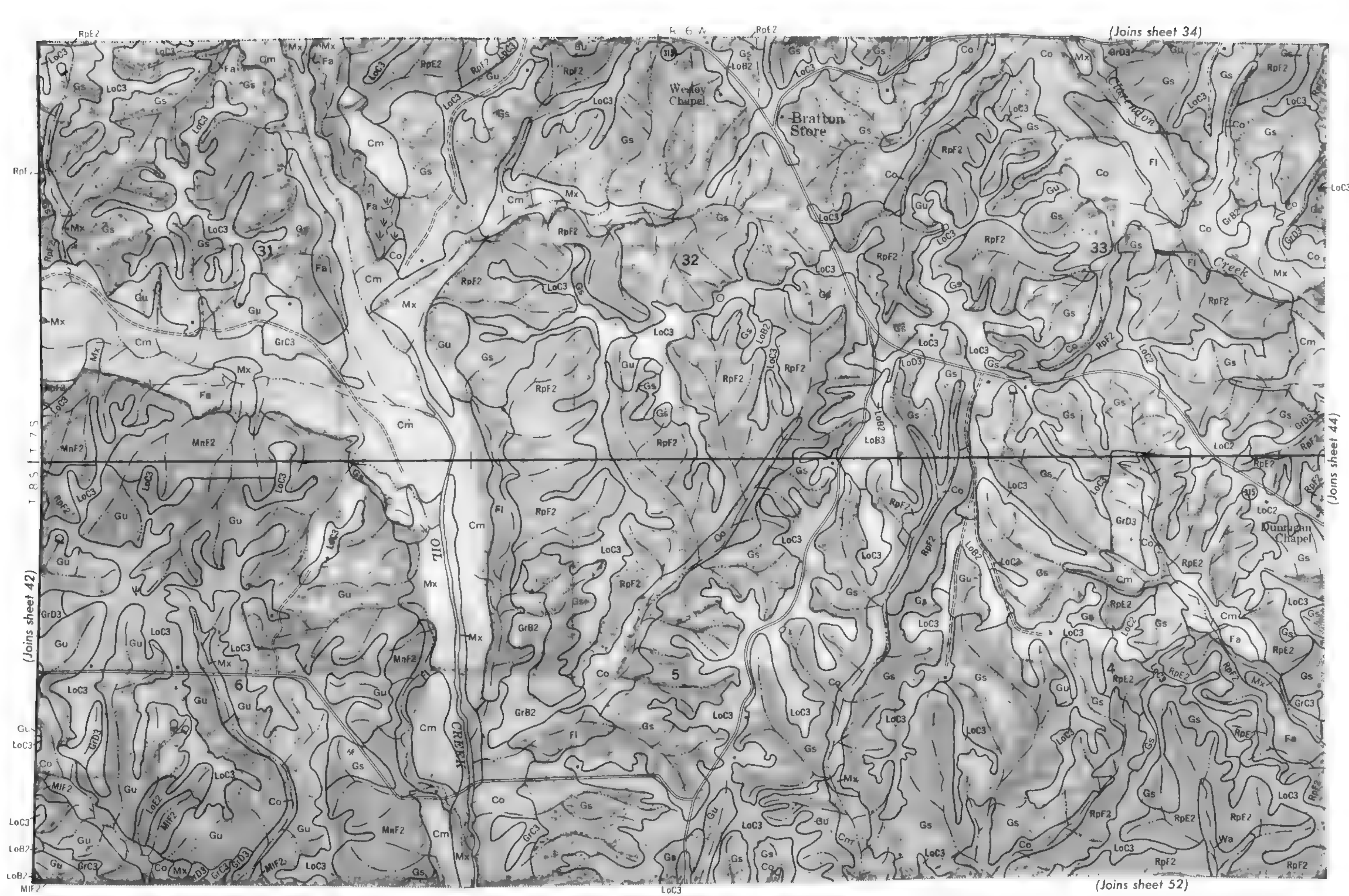
0 ½ Mile

0 3000 Feet

½ Mile Scale 1:15 840 0 Feet



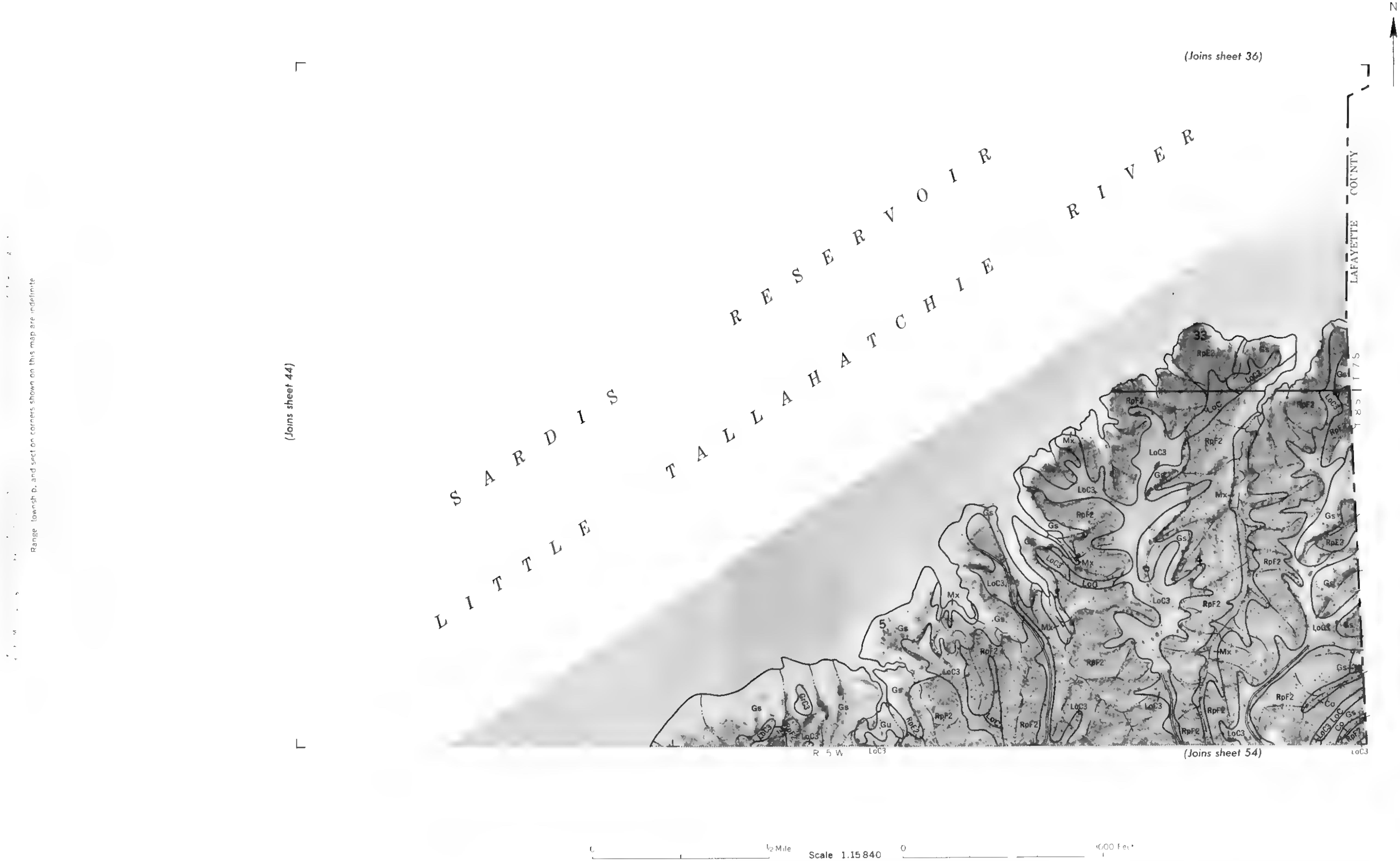
Scale 1:15 840

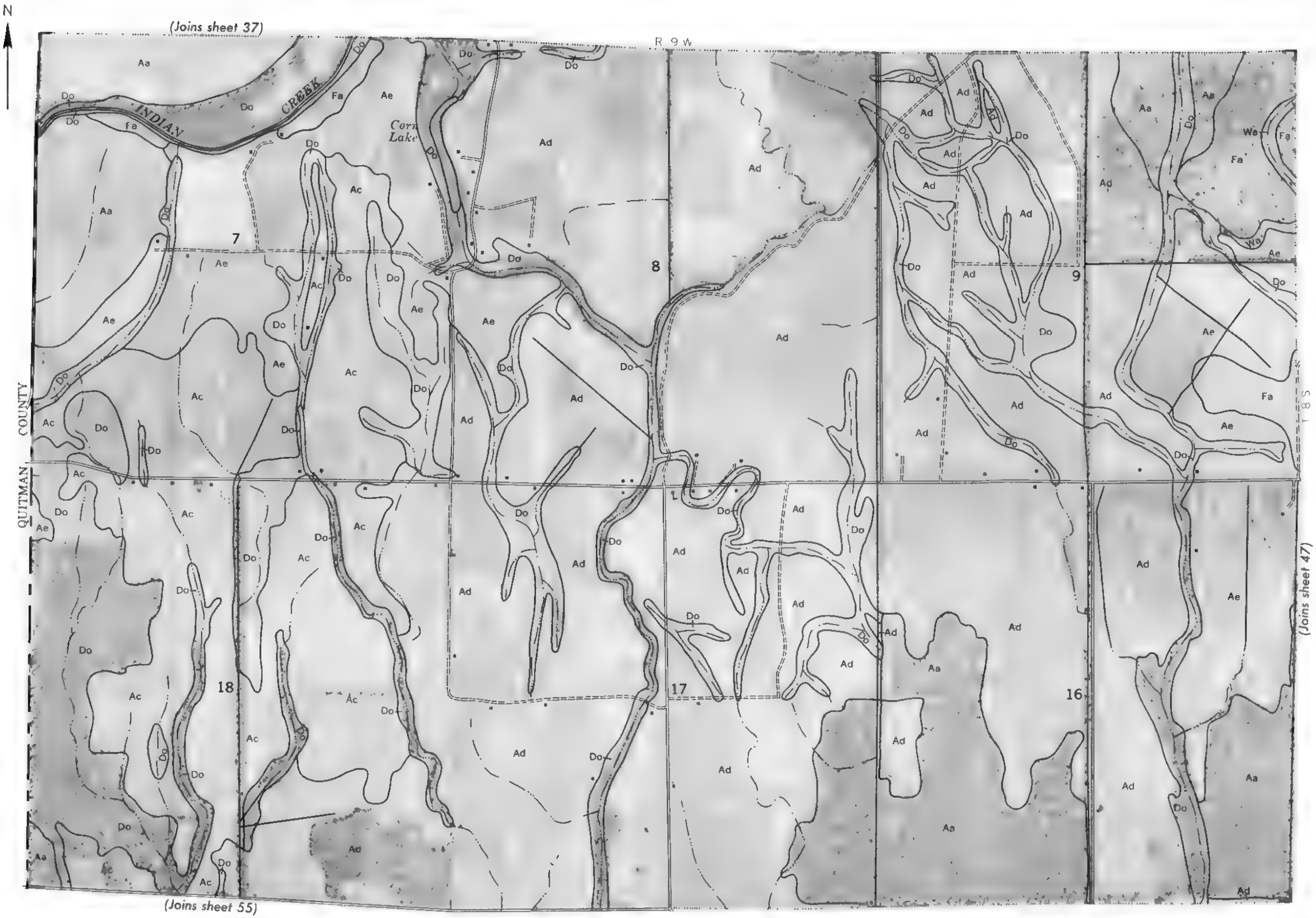


Scale 1:15 840

3000 Feet

½ Mile Scale 1:15 840 0 3000 Feet


N
(Joins sheet 36)
(Joins sheet 44)
(Joins sheet 54)
SARDIS RESERVOIR
LITTLE TALLAHATCHIE RIVER
LAFAYETTE COUNTY
T 7 S
T 8 S
R 5 W
33
4
5
RpE2
Gs
LoC3
RpF2
LoC
Mx
Gu
Co
Range, township, and section corners shown on this map are indefinite
½ Mile
Scale 1:15 840
0

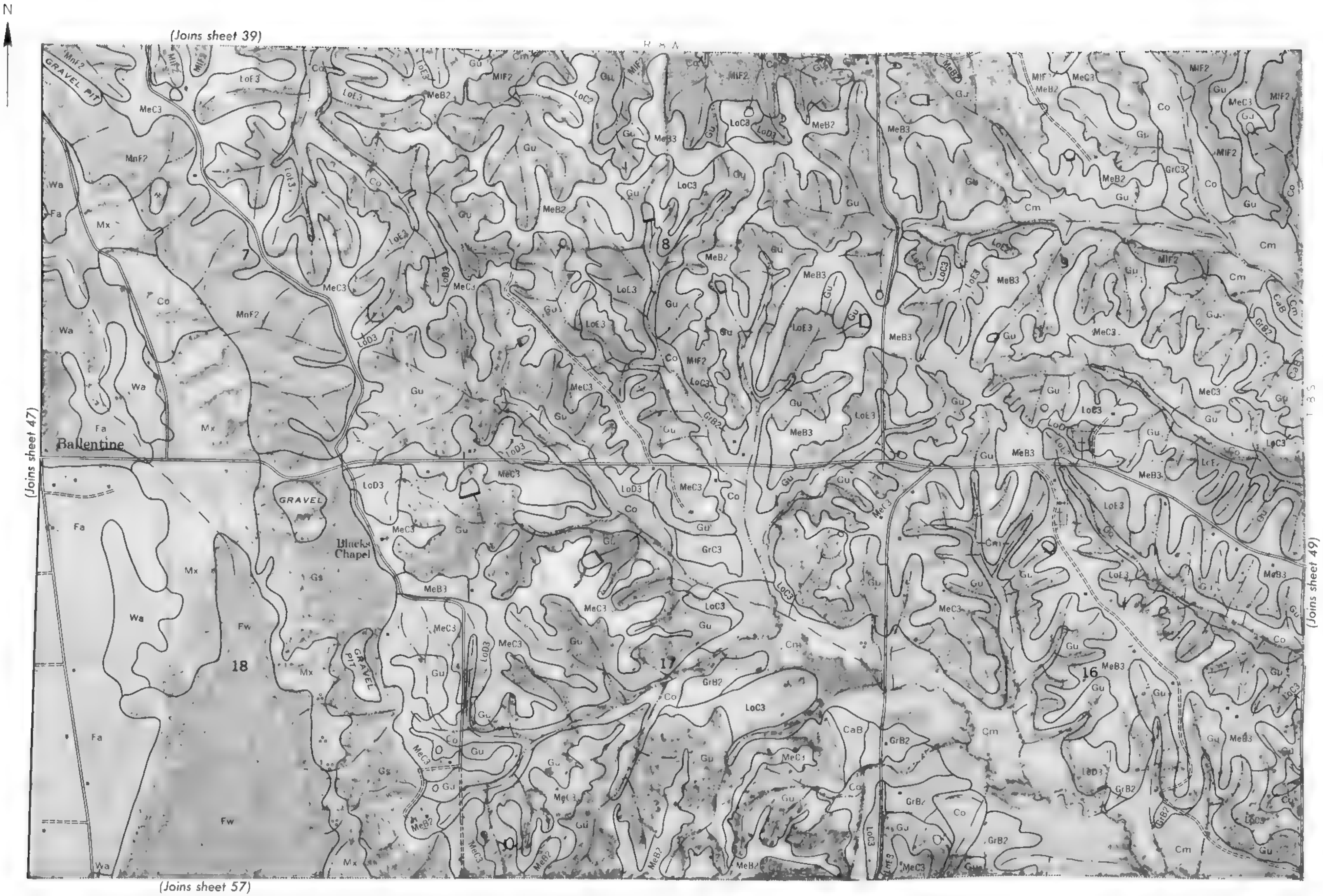


0 ½ Mile Scale 1:15840 0 3000 Feet

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1962 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture and the Mississippi Agricultural Experiment Station

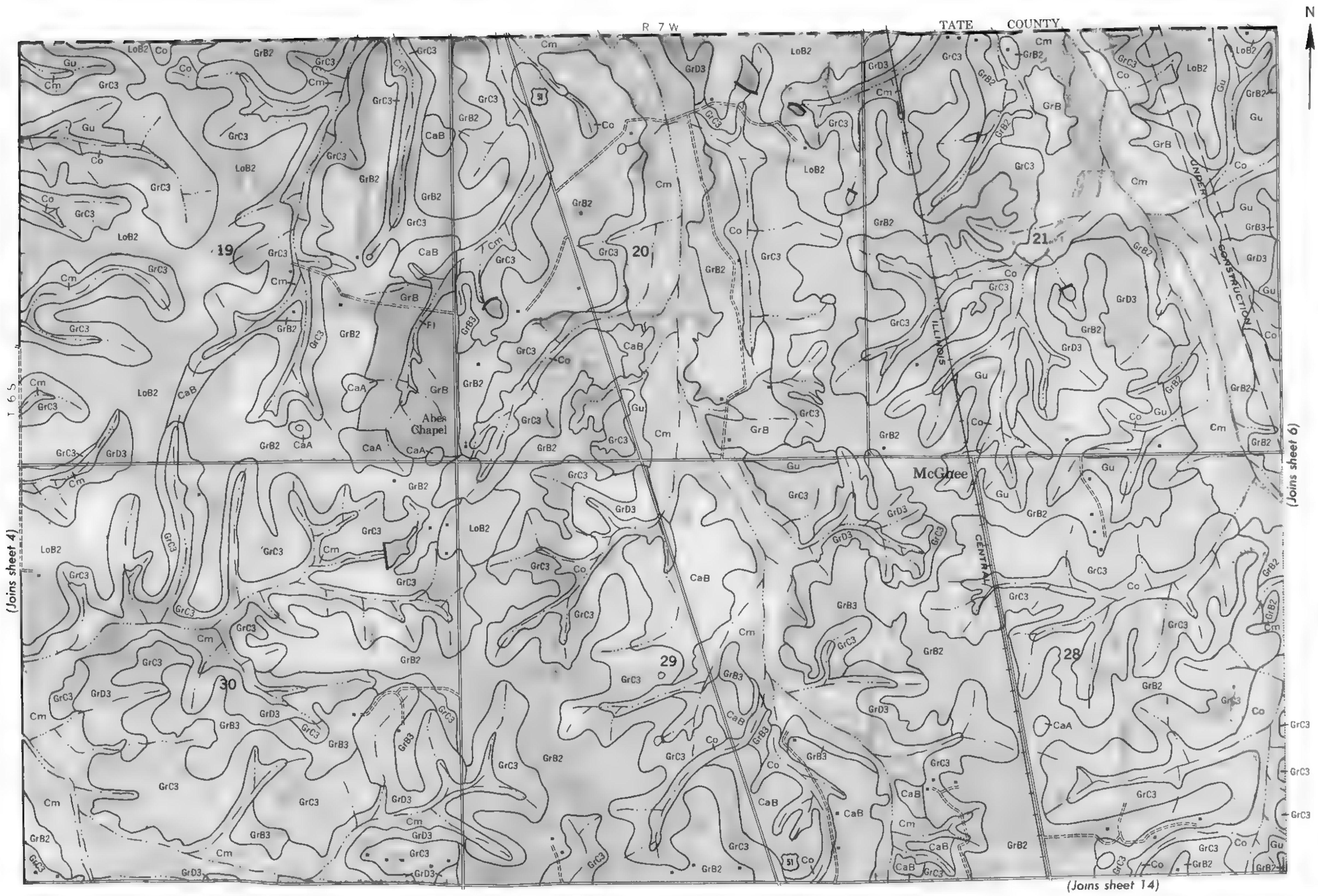
Range, township, and section corners shown on this map are indefinite



0 ½ Mile Scale 1:15 840 0 3000 Feet

N

0 ½ Mile Scale 1:15 840 0 3000 Feet



0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1962 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Mississippi Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

Scale 1:15 840

0 ½ Mile Scale 1:15 840 0 3000 Feet

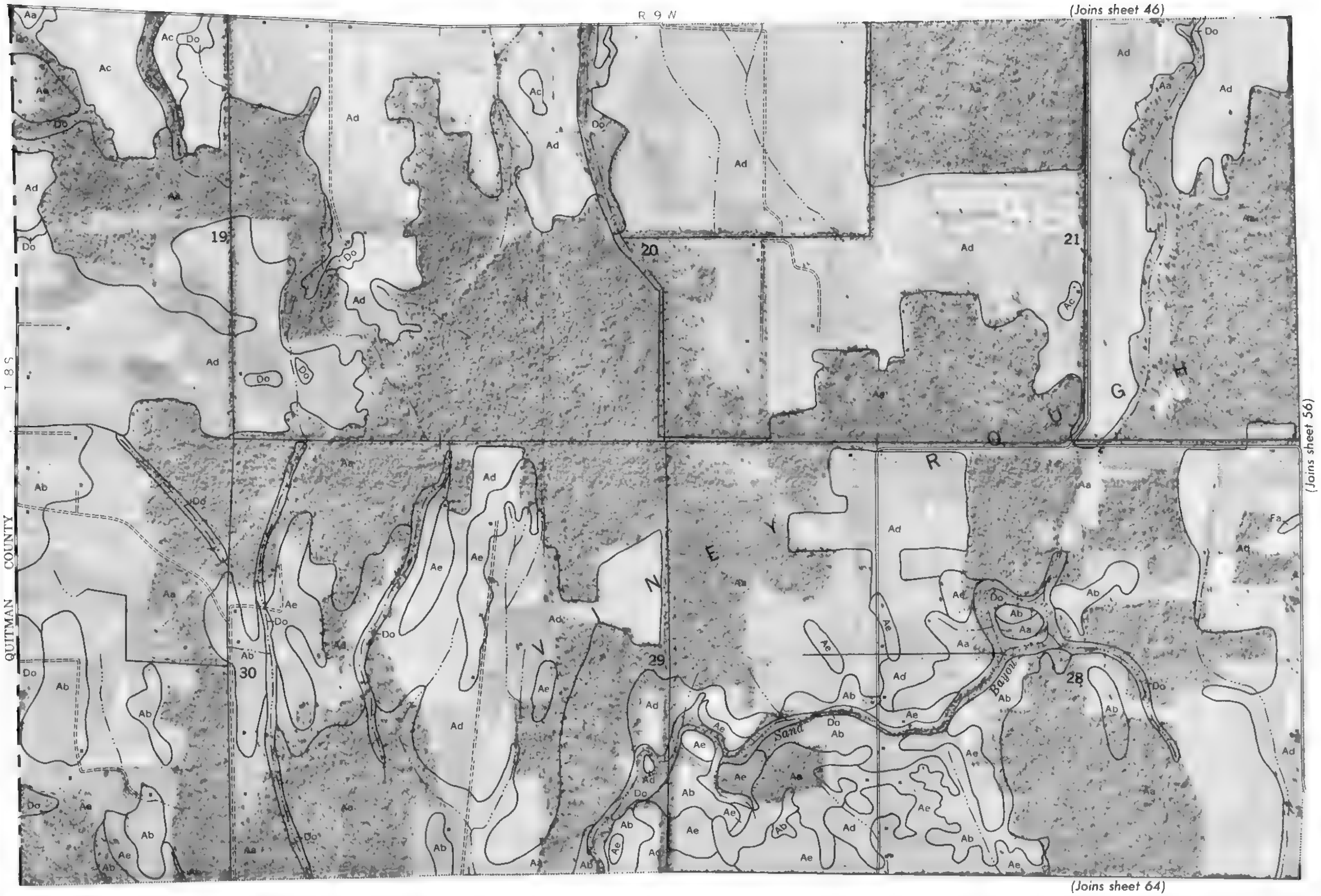
0 ½ Mile Scale 1:15 840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite

0 ½ Mile Scale 1:15 840 0 3000 Feet

0 ½ Mile Scale 1:15 840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite

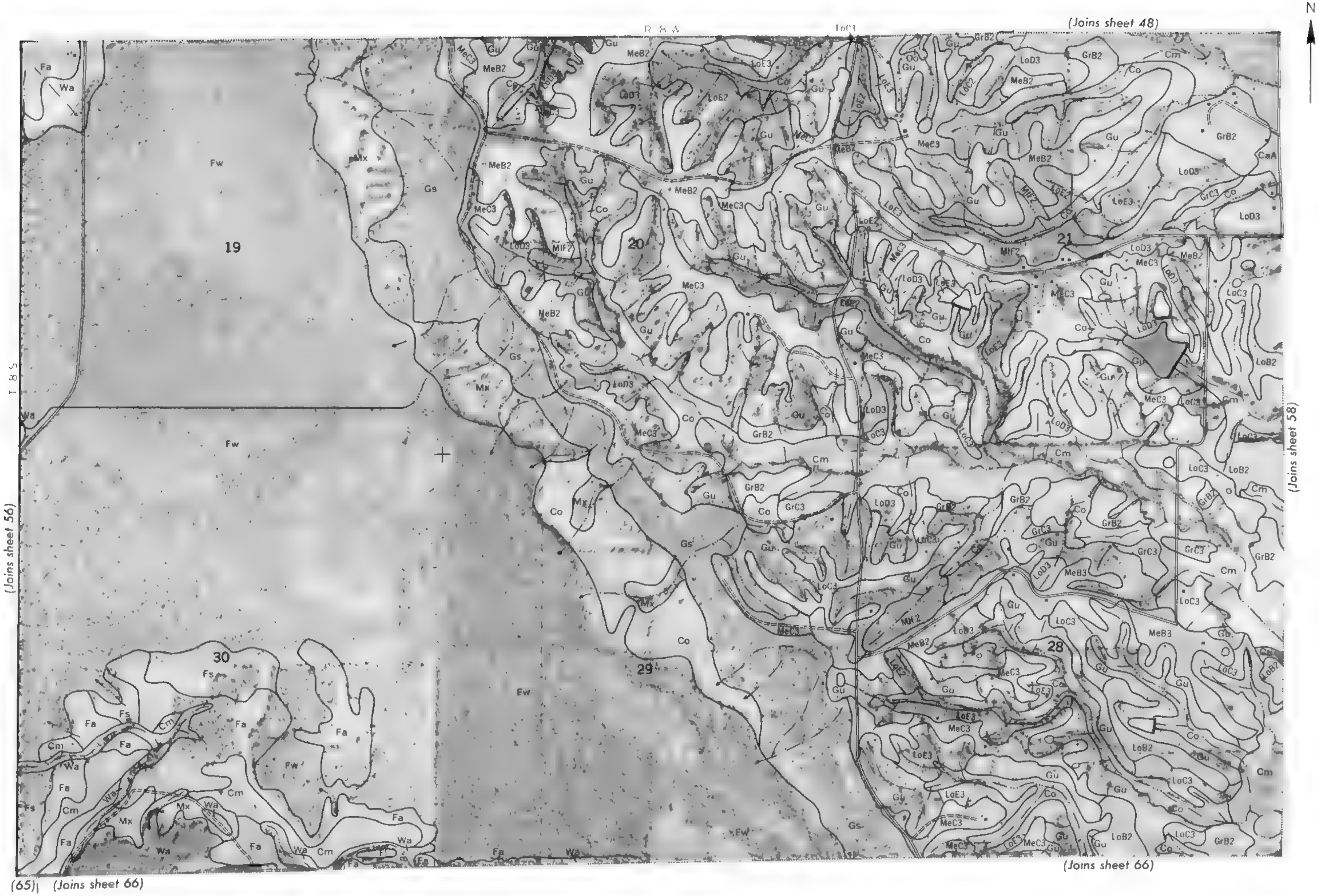


0 ½ Mile Scale 1:15 840 0 3000 Feet

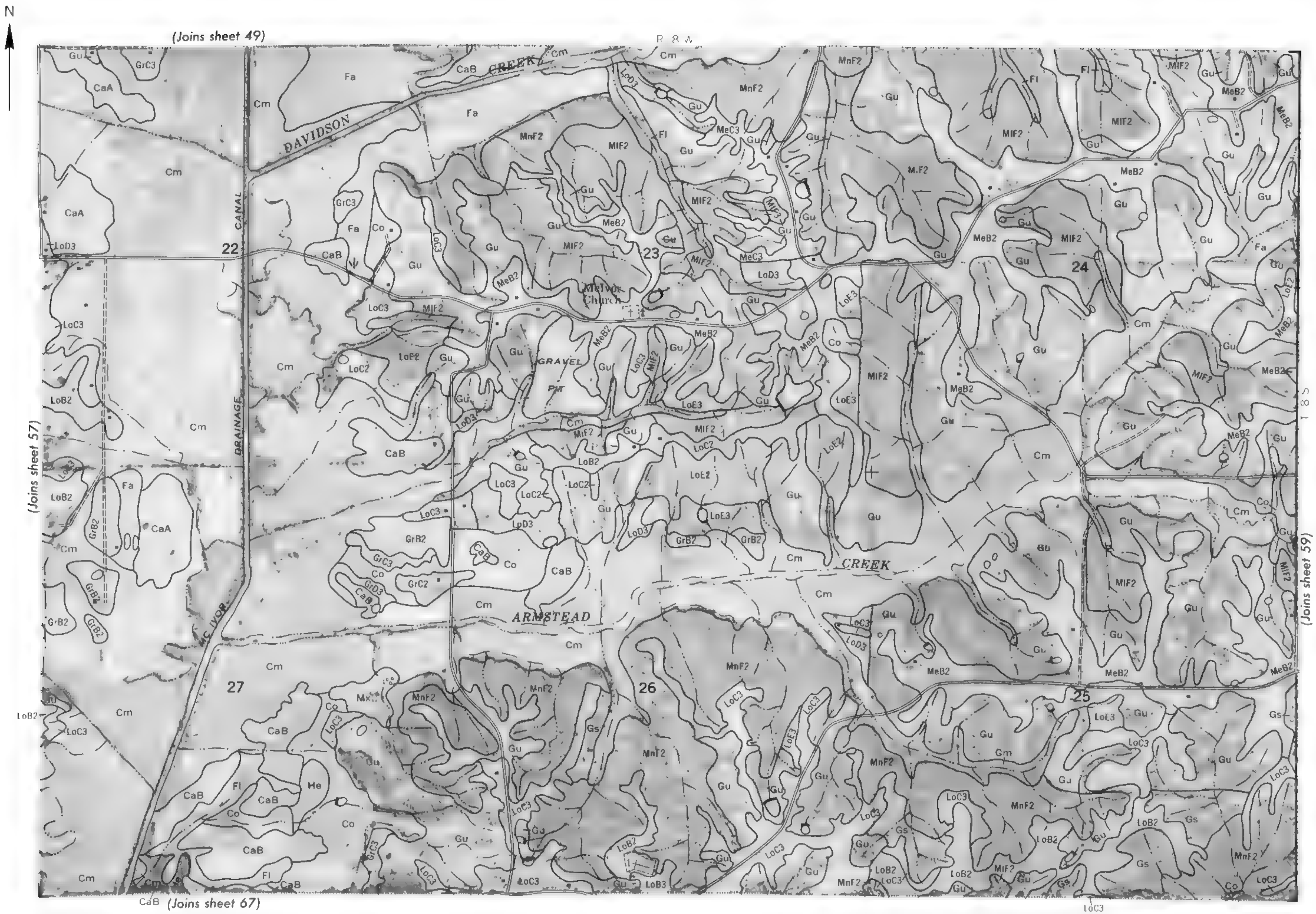
0 ½ Mile Scale 1:15 840 0 5000 Feet

(57)

Range, township, and section corners shown on this map are indefinite



0 ½ Mile Scale 1:15 840 0 3000 Feet



0 ½ Mile Scale 1:15 840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite.

0 1 Mile Scale 1:15 840 0 5000 Feet

PANOLA COUNTY, MISSISSIPPI — SHEET NUMBER 6

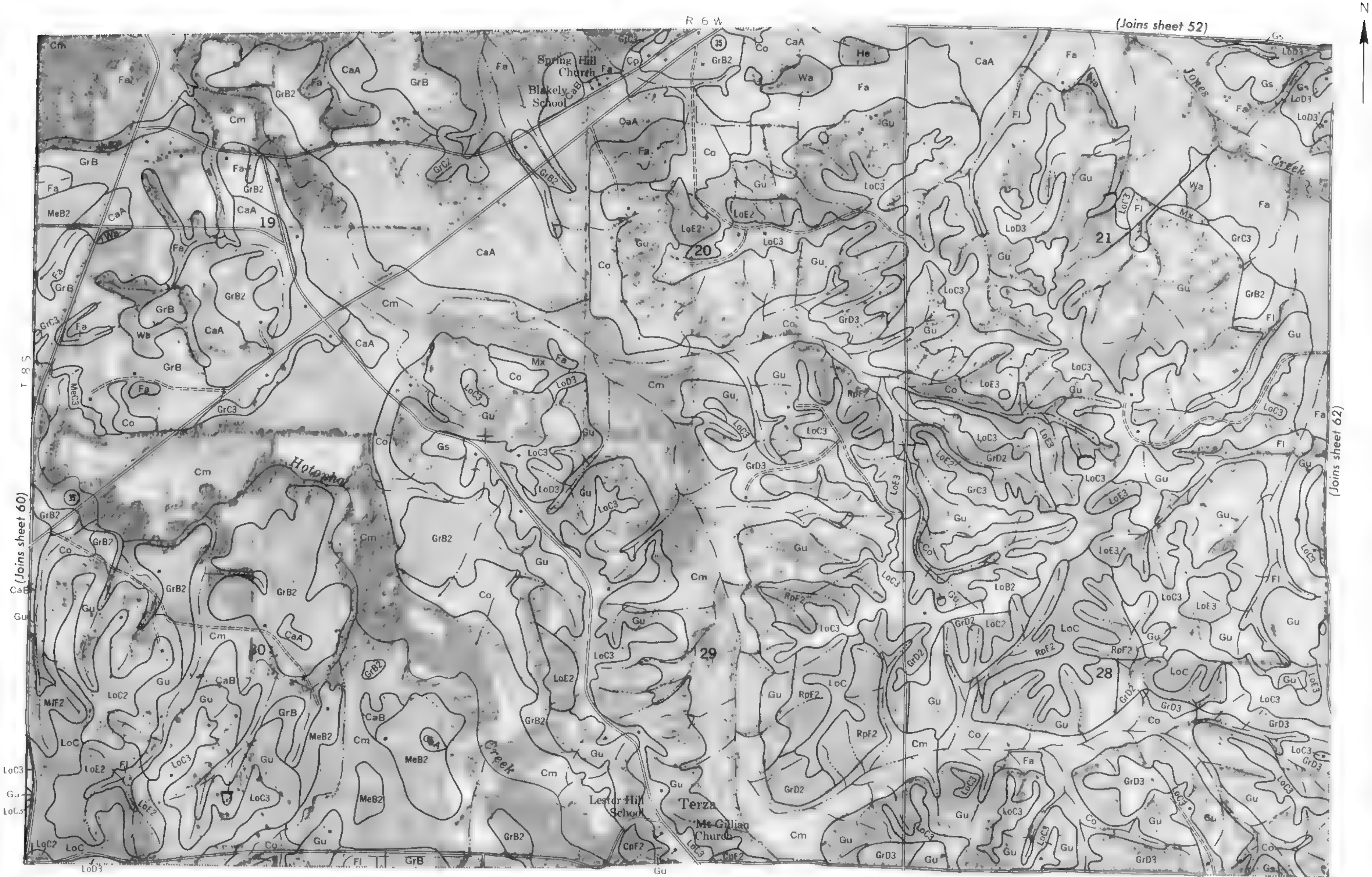
N

0 ½ Mile Scale 1:15 840 0 3000 Feet

Scale 1:15840

0 ½ Mile

0 3000 Feet



Scale 1:15 840

4000 Feet

0 ½ Mile Scale 1:15 840 0 3000 Feet

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Range, township and section corners shown on this map are indefinite.

N

0 ½ Mile Scale 1:15 840 0 3000 Feet

64

Scale 1:15 840

0 ½ Mile

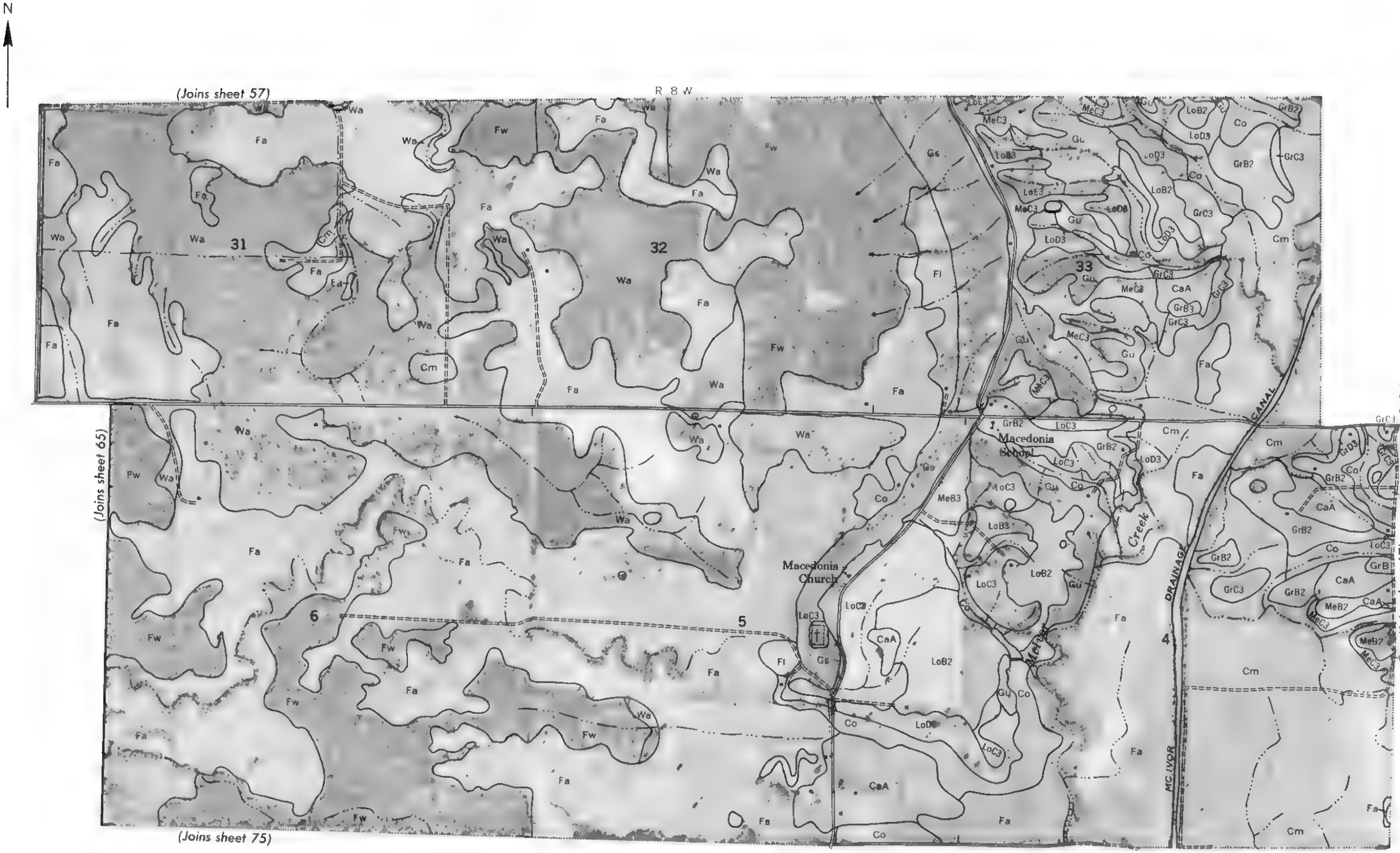
0 3000 Feet

N

This map is one of a set compiled in 1962 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Mississippi Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

0 ½ Mile Scale 1:15 840 0 3000 Feet



0 ½ Mile Scale 1:15 840 0 4000 Feet

N

Scale 1:15 840

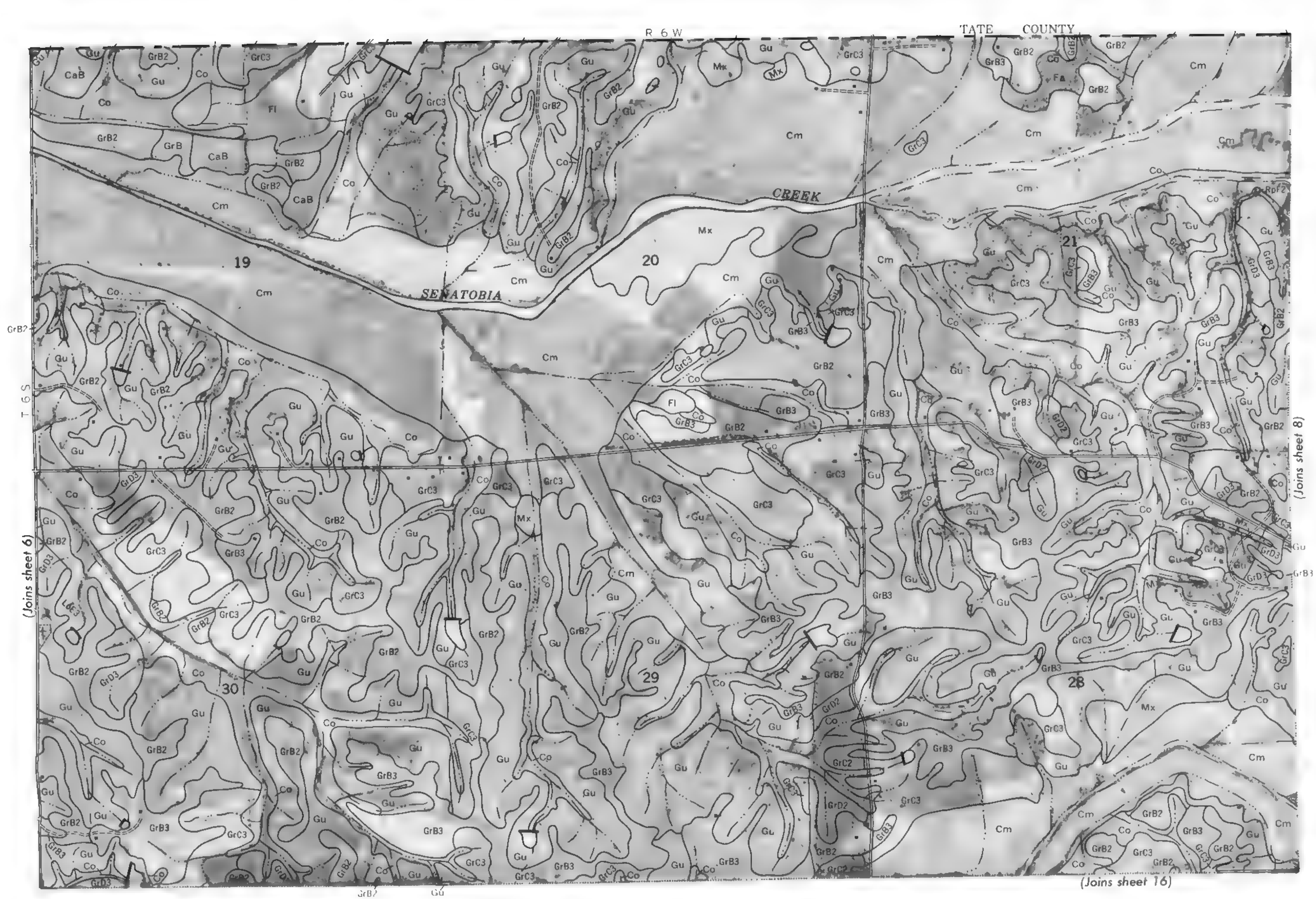
1 Mile

0

3000 Feet

0 ½ Mile Scale 1:15840 0 3000 Feet

Scale 1:15 840



0 ½ Mile Scale 1:15 840 0 3000 Feet

PANOLA COUNTY, MISSISSIPPI — SHEET NUMBER 70

0 ½ Mile Scale 1:15 840 0 3000 Feet

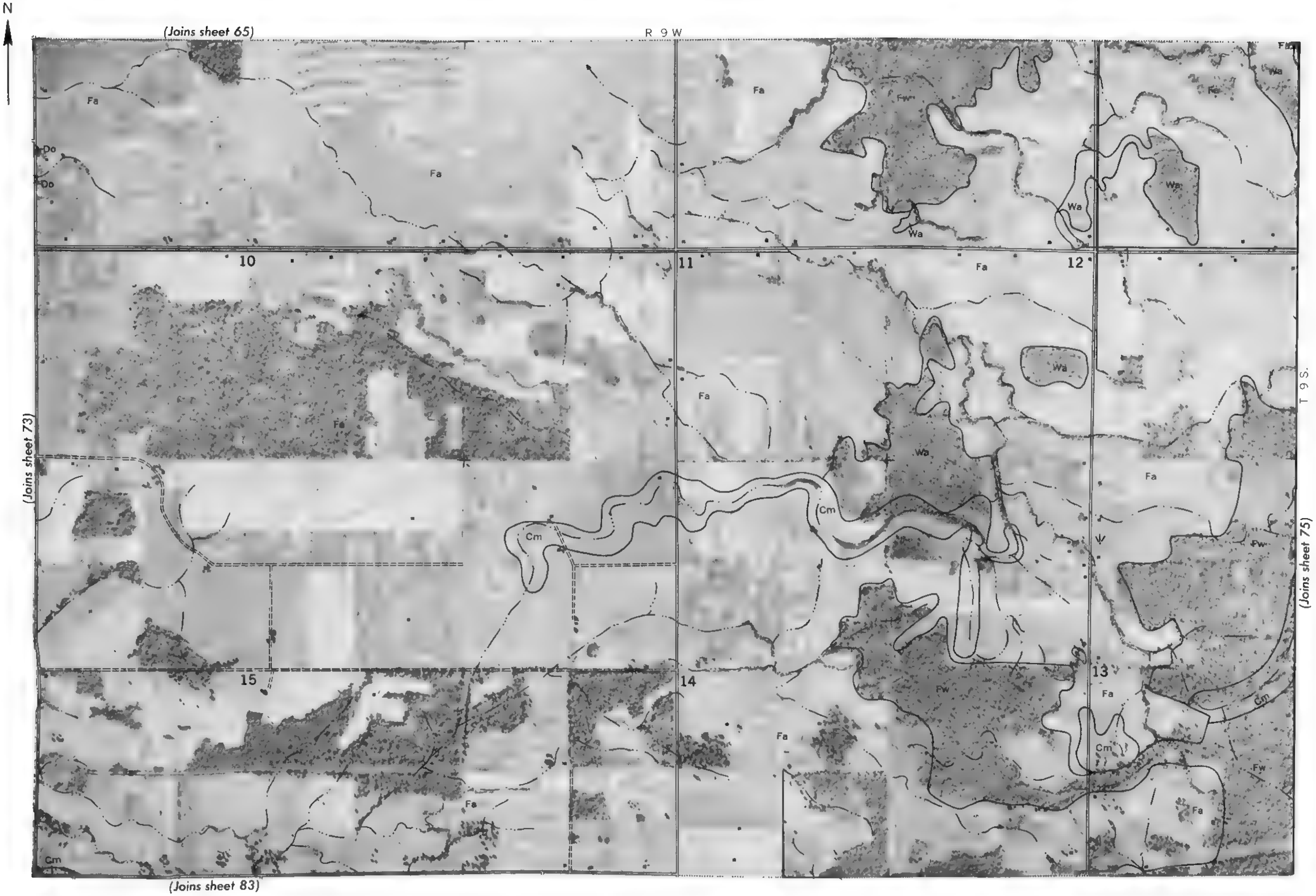
Scale 1:15 840

0 ½ Mile Scale 1:15 840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite.

0 ½ Mile Scale 1:15 840 0 3000 Feet

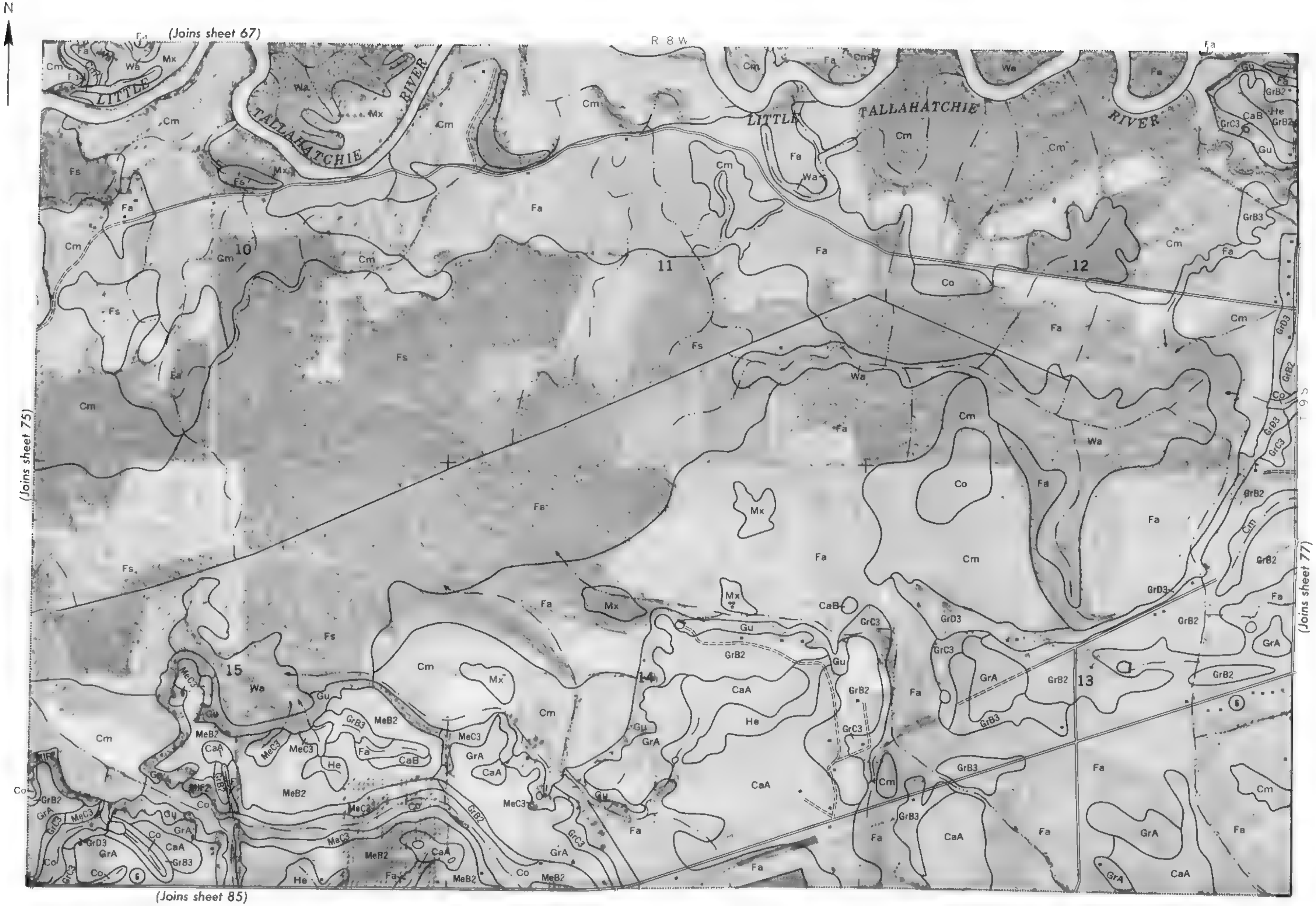
74



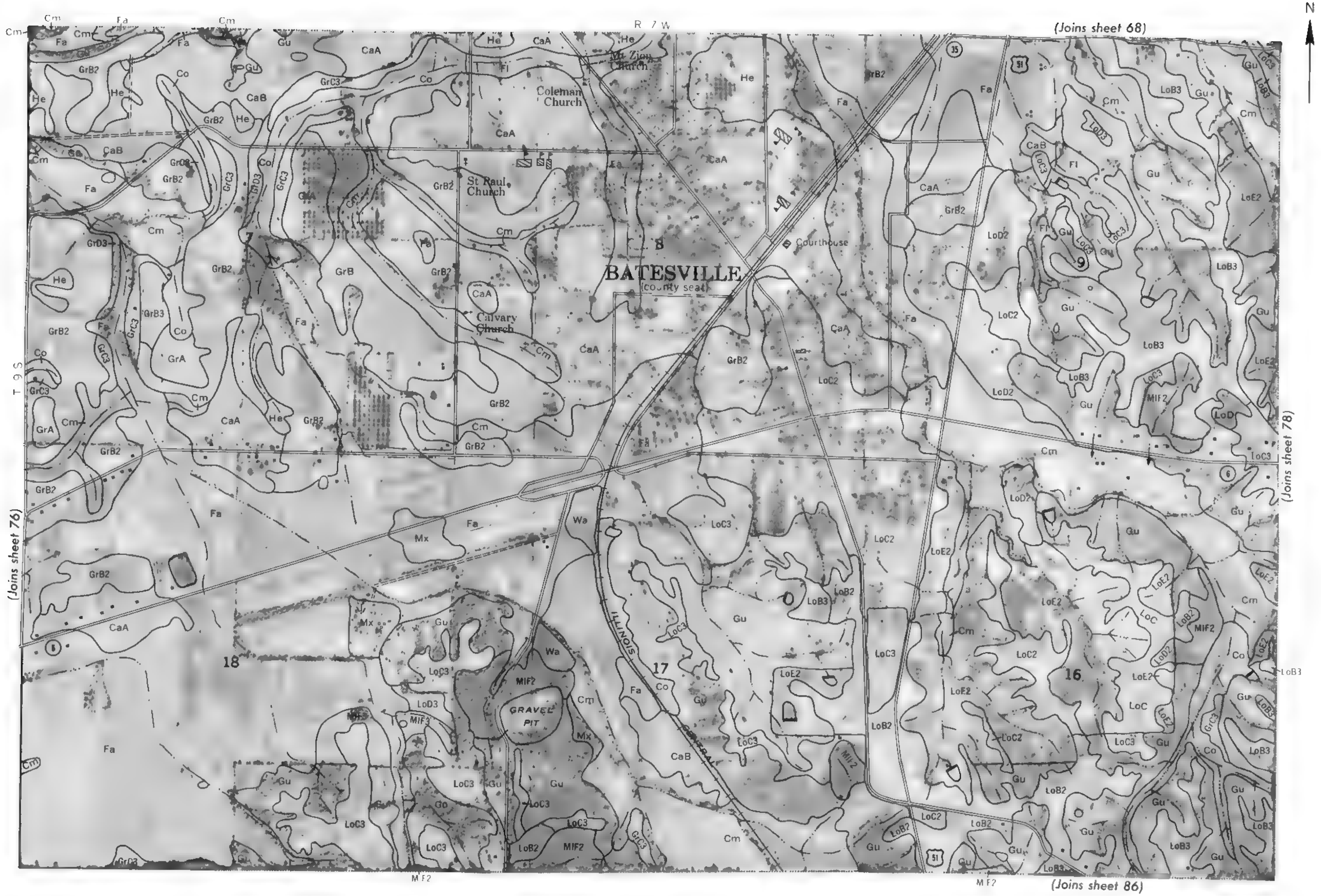
0 ½ Mile Scale 1:15 840 0 3000 Feet

0 ½ Mile Scale 1:15 840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite



0 ½ Mile Scale 1:15 840 0 3000 Feet

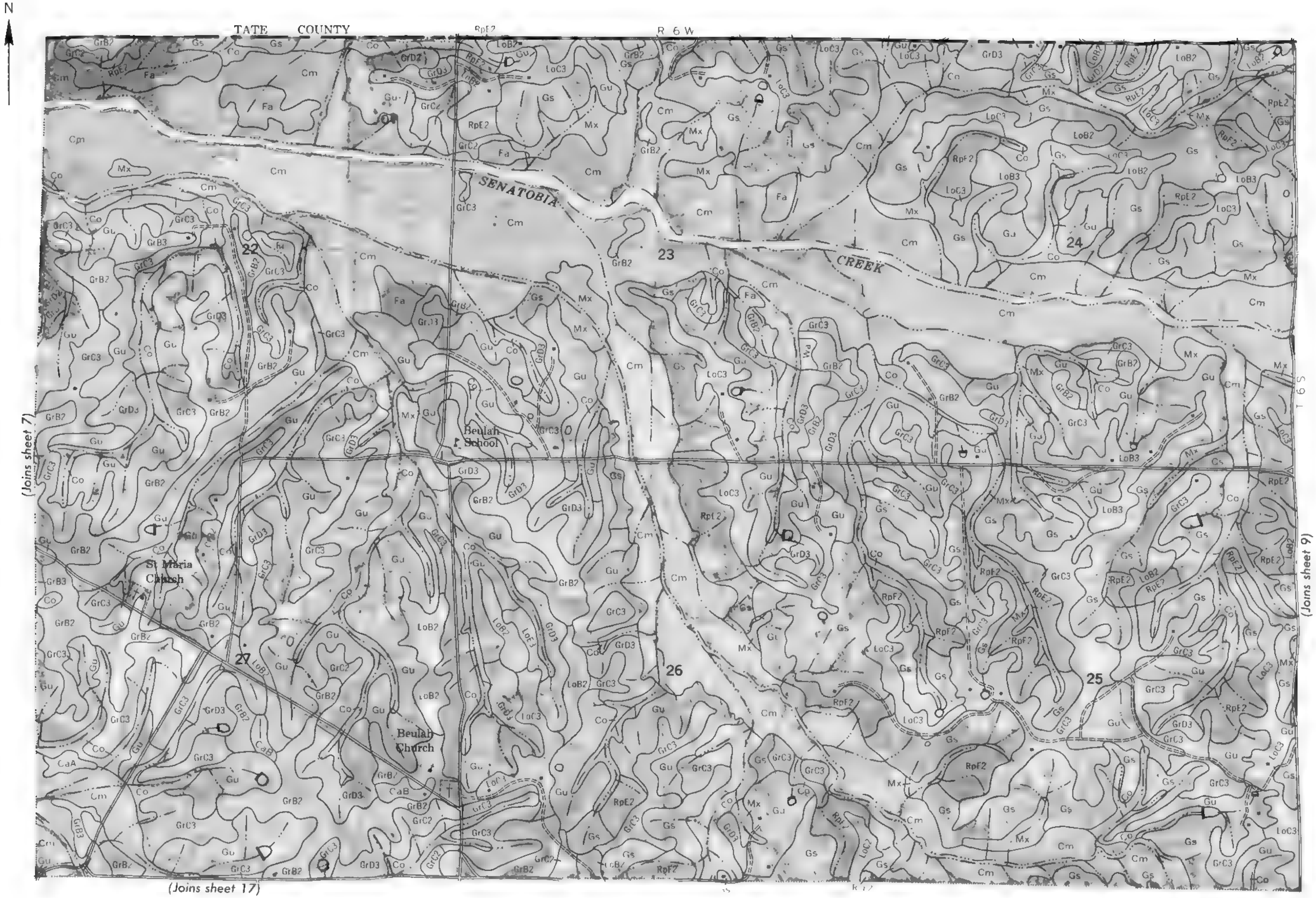


0 ½ Mile Scale 1:15 840 0 1000 Feet

0 ½ Mile Scale 1:15 840 0 3000 Feet

Scale 1:15 840

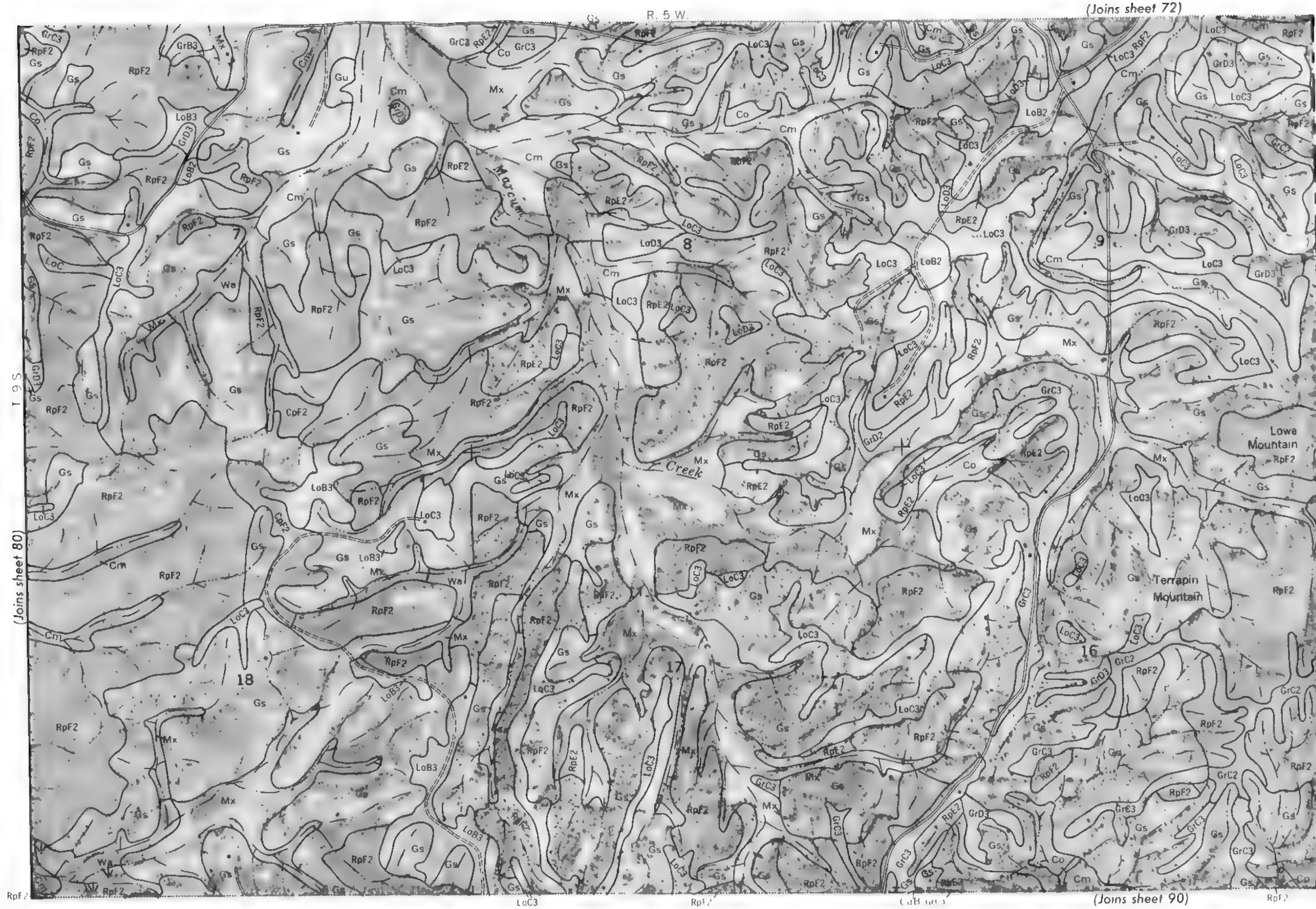
(8)



0 ½ Mile Scale 1:15 840 0 3000 Feet

0 1 Mi Scale 1:15 840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite



Scale 1:15 840

0 1 Mile

0 3000 Feet

0 ½ Mile Scale 1:15 840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite

½ Mile Scale 1:15 840 0 3000 Feet

84

N

(Joins sheet 75)

(Joins sheet 83)

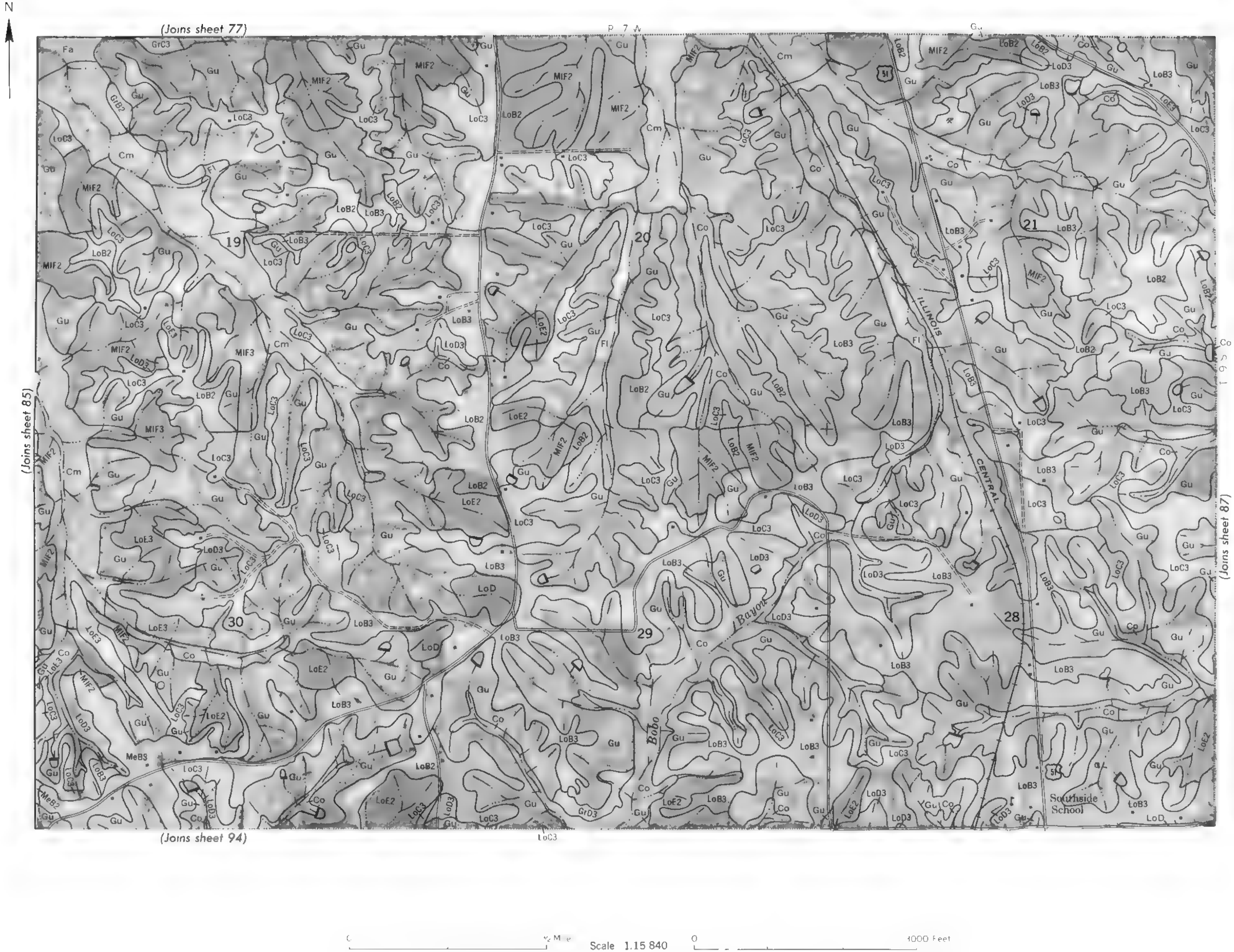
(Joins sheet 85)

(Joins sheet 92)

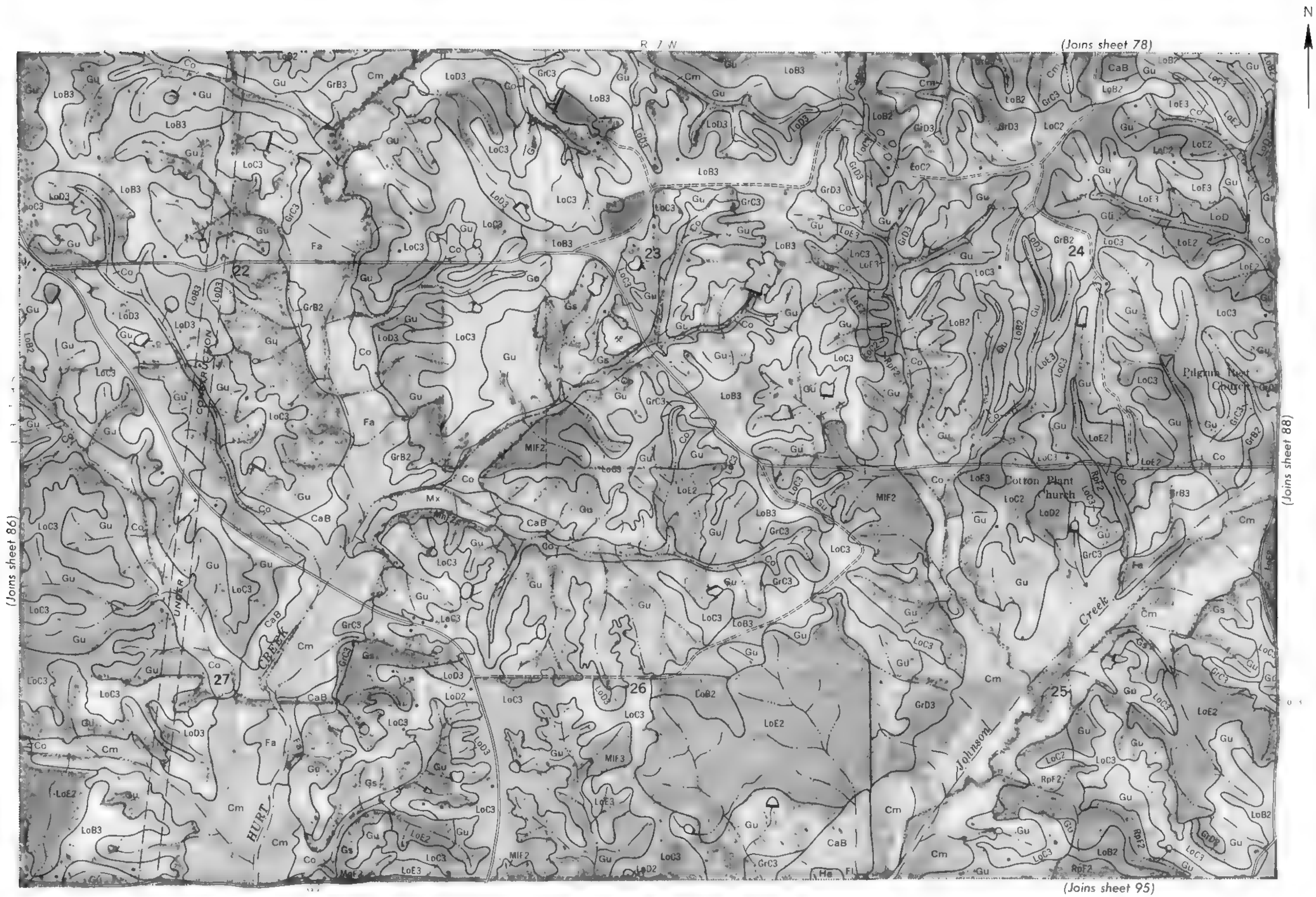
0 ½ MI Scale 1:15 840 0 5000 Feet

Scale 1:15 840

(86)

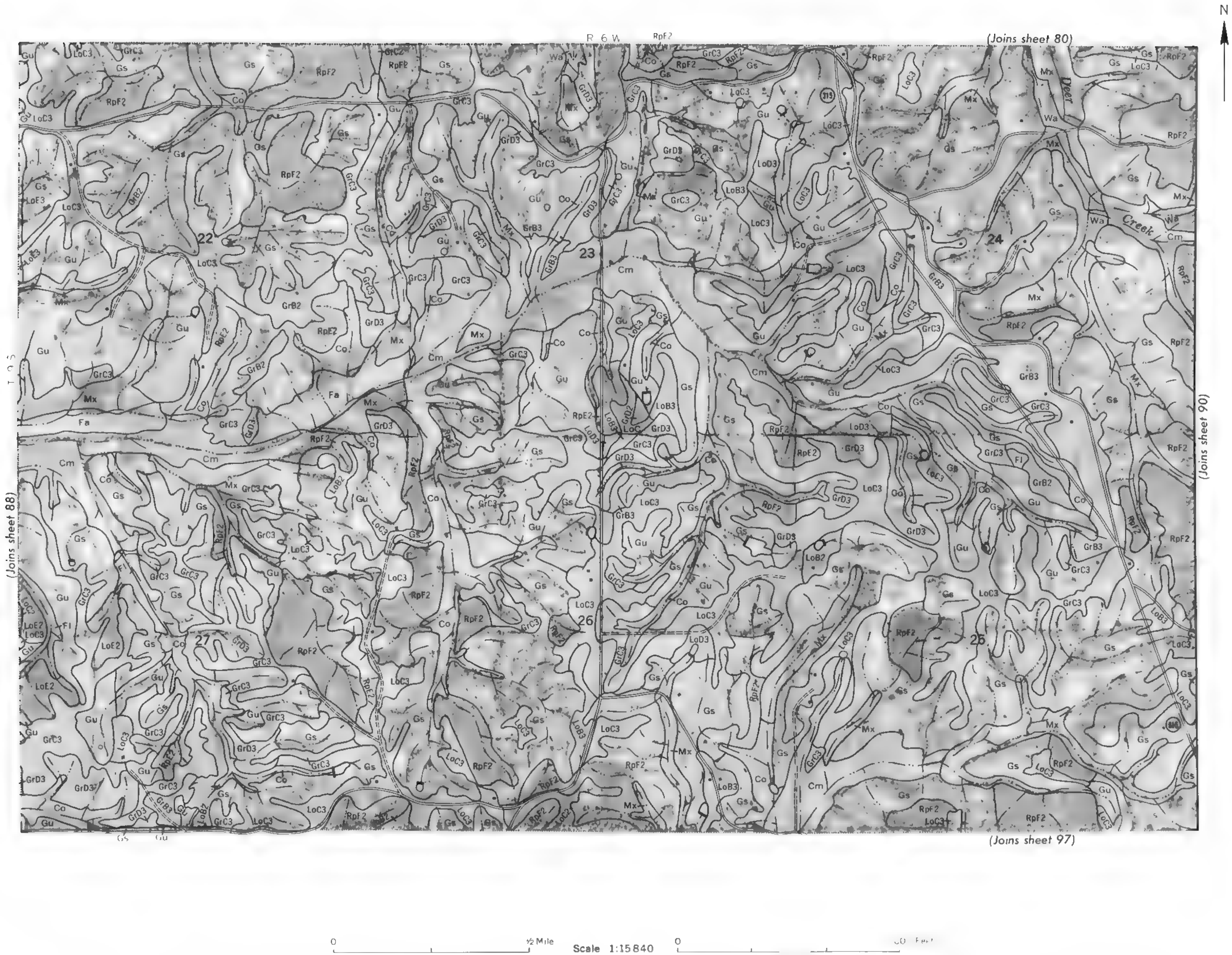


Scale 1:15 840



Scale 1:15 840

Scale 1:15 840



Scale 1:15 840

0 ½ Mile Scale 1:15 840 0 Feet

0 ½ Mile Scale 1:15 840 0 3000 Feet

0 ½ Mile Scale 1:15840 0 3000 Feet

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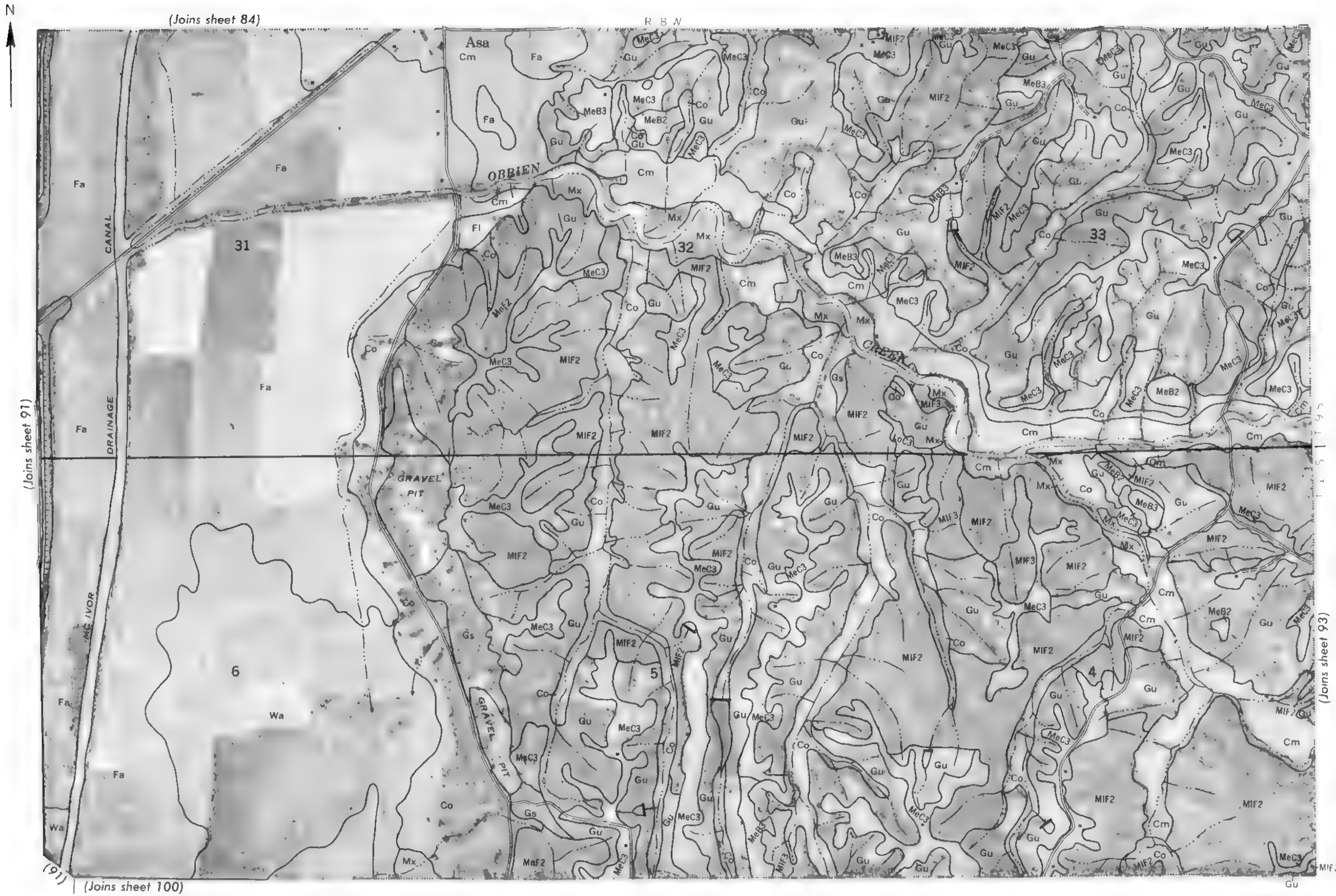
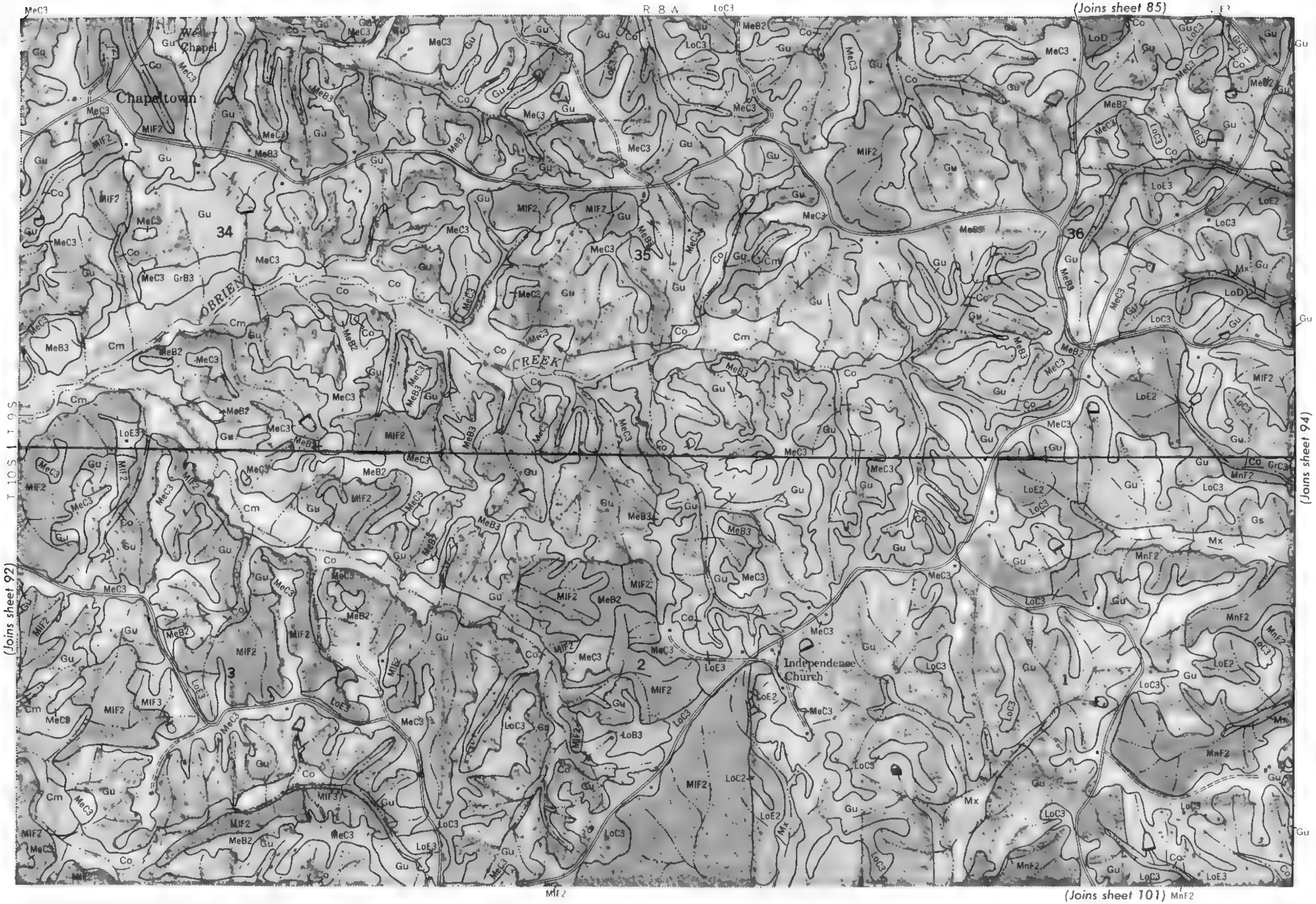
Range, township, and section corners shown on this map are indefinite

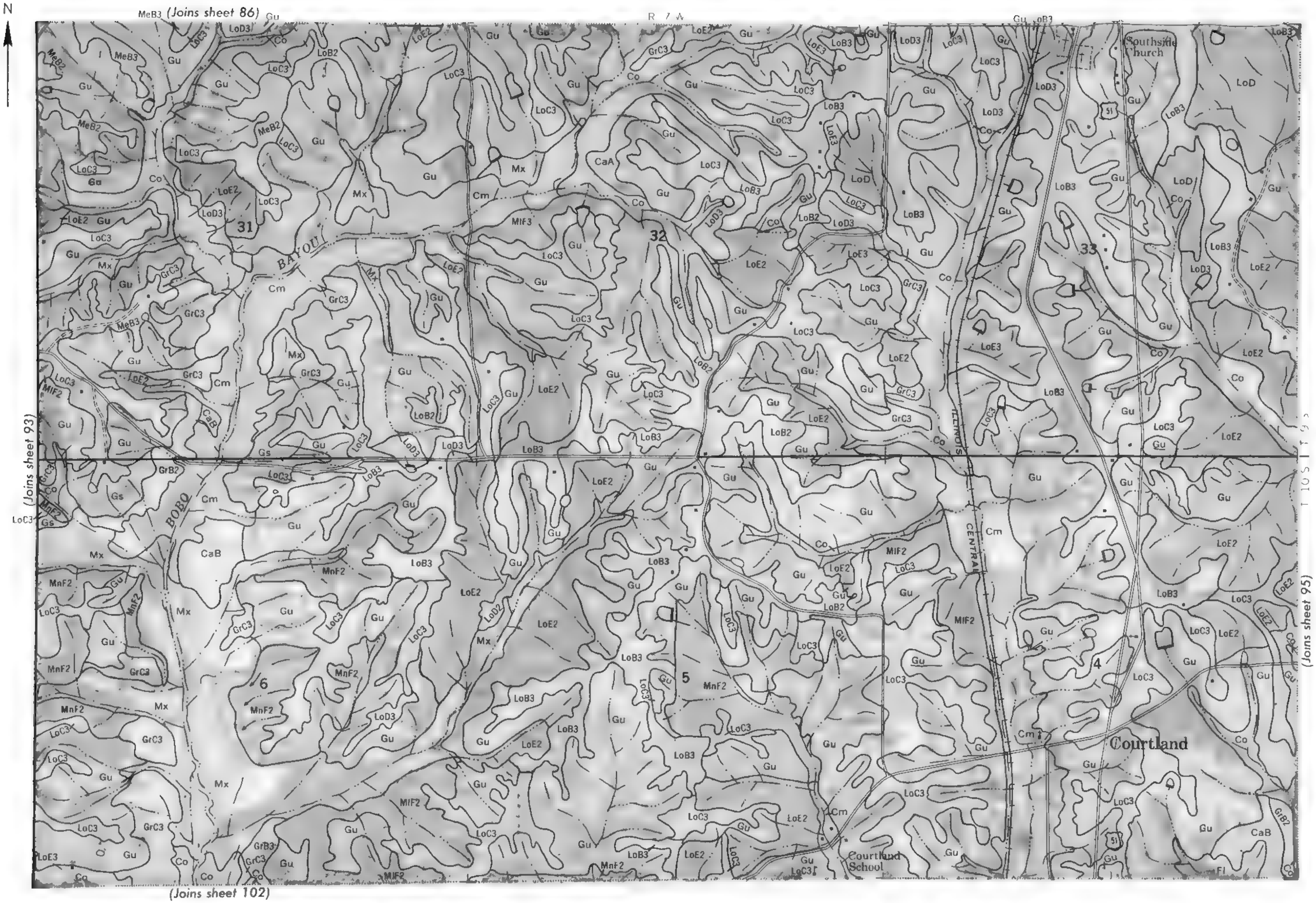


Scale 1:15 840

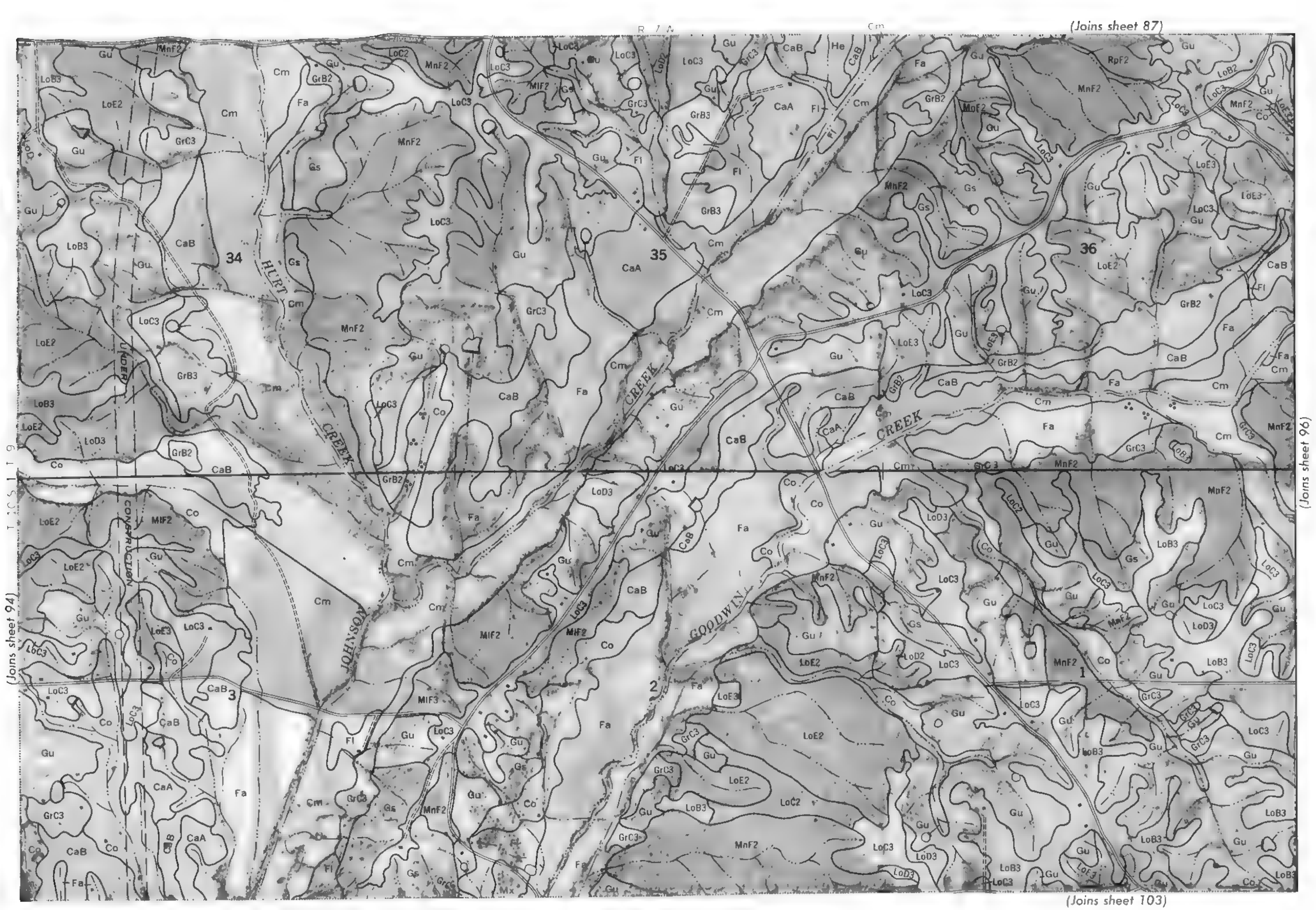
0 3000 Feet



0 ½ Mile Scale 1:15 840 0 5000 Feet



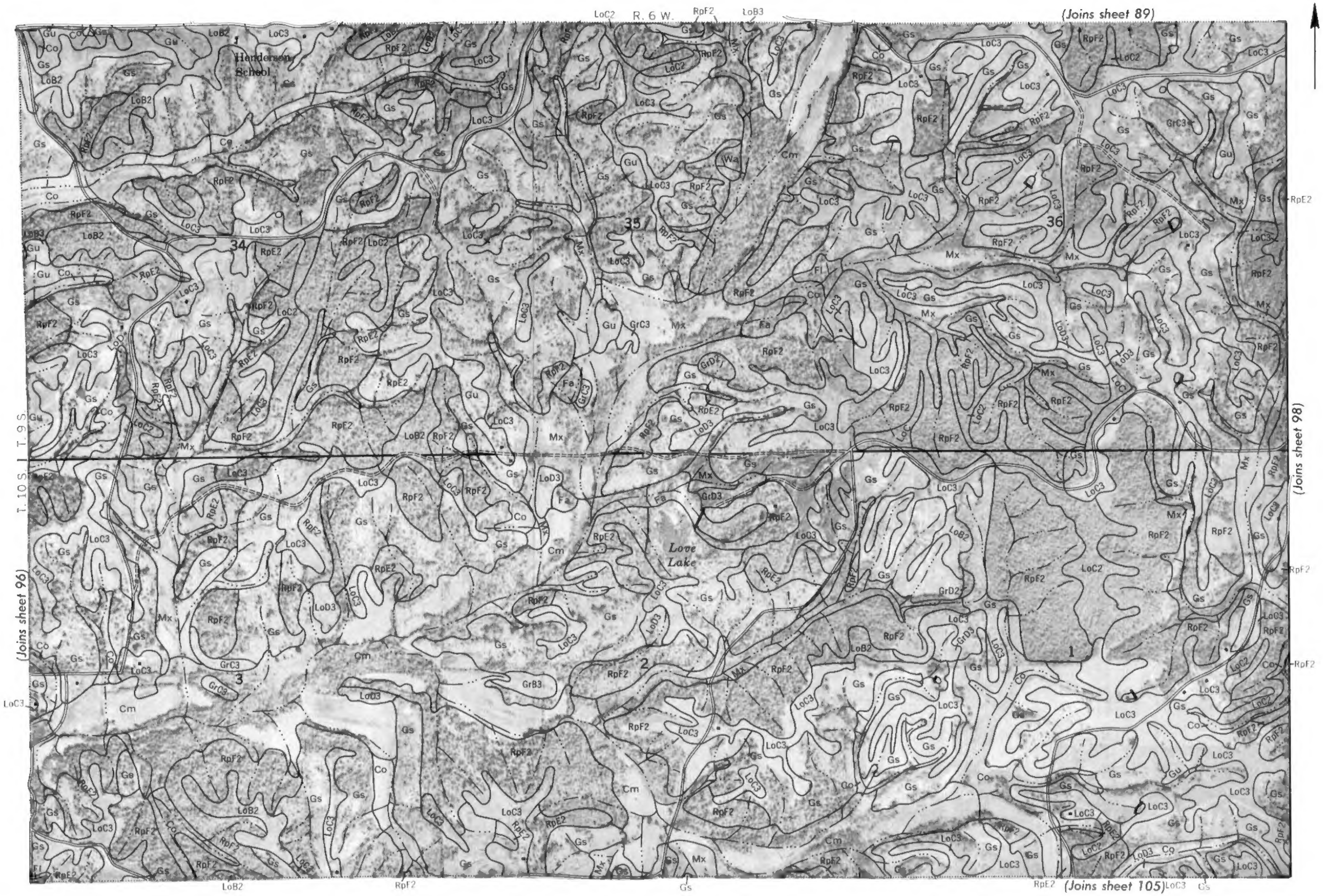
0 ½ Mile Scale 1:15 840 0 3000 Feet



Scale 1:15 840

PANOLA COUNTY, MISSISSIPPI — SHEET NUMBER 96

0 ½ Mile Scale 1:15840 0 3000 Feet



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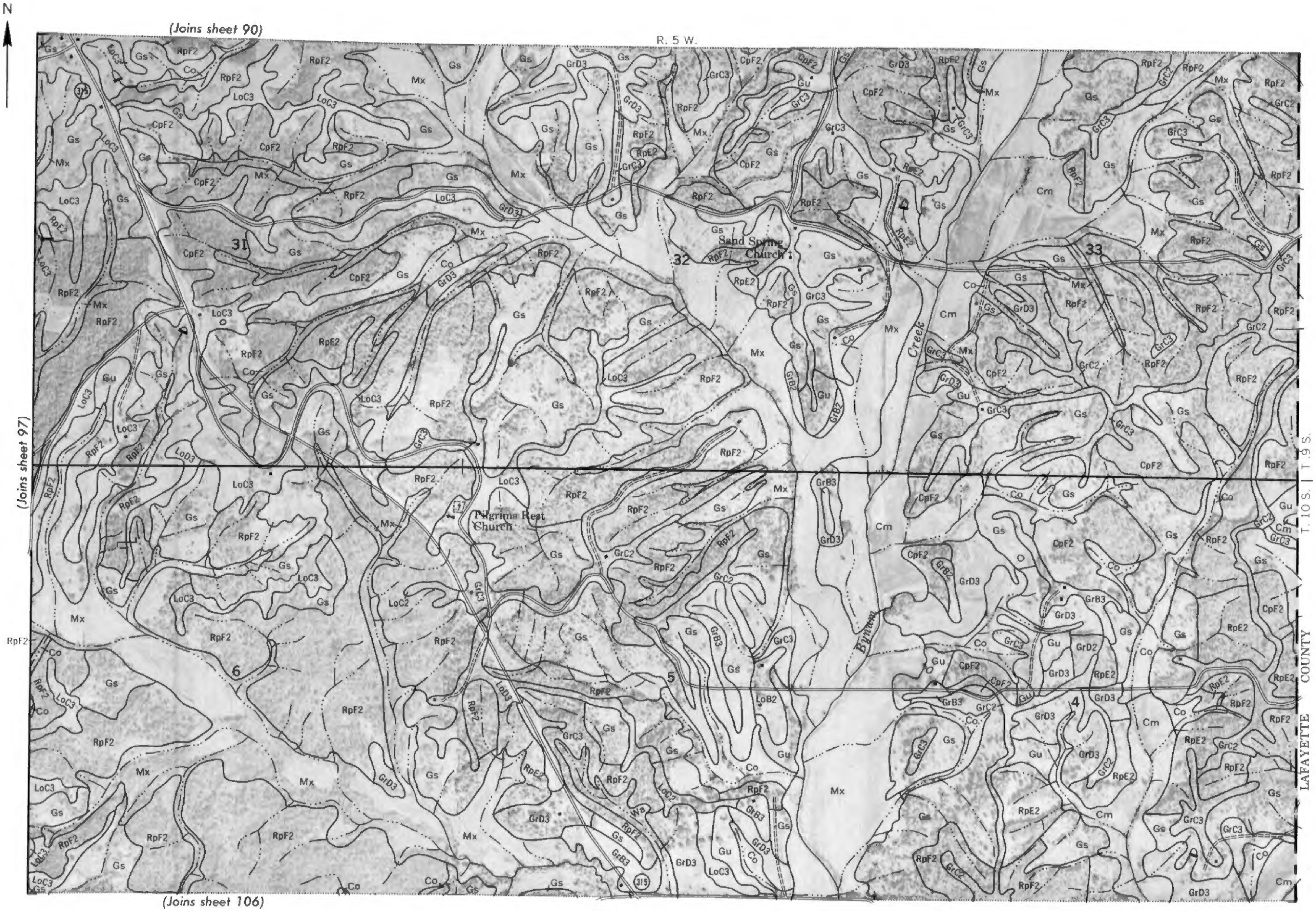
Range, township, and section corners shown on this map are indefinite.

0 ½ Mile Scale 1:15 840 0 3000 Feet



0 ½ Mile Scale 1:15 840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite.

0 ½ Mile Scale 1:15 840 0 3000 Feet